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The Tactical Air Command Today

Major General E. R. Quesada,
Commanding General, Tactical Air Command

In warfare today it is not enough to be in possession of new, powerful weapons. To use a weapon effectively and decisively, it is equally necessary to have an organization to apply it for maximum effect.

This has twice been demonstrated in our greatest wars. In World War I, the British, seeking to break the stalemated western front, developed in secrecy armored tanks designed to overcome the preponderant authority that machine guns had given to the defensive. The British employed tanks in force at Cambrai. The tanks were an immediate success. German lines were broken and the gate was open to a sweeping victory. But while developing the tank, the British failed to develop an organization to take advantage of the tank. Breakthrough was achieved, but exploitation was left in the hands of infantrymen who could neither advance quickly enough nor be supplied effectively to make tank warfare effective. An organization designed to take advantage of armored warfare was not developed throughout World War I. It remained for World War II, and the Nazis, to demonstrate dramatically what could be done with armored forces, given the opportunity to utilize properly the advantages of mobile, armored warfare.

In the last war we saw another prime example of a decisive weapon being wasted because of errors in organization. Airpower came of age in World War II. It achieved such hegemony over the battlefield that it became axiomatic that a surface engagement could not start until the air battle was decided. The Allies, with superb organization, machines, and trained men, were clearing the German Air Force from the skies and were subjecting the Reich to the most destructive onslaught that has ever been experienced in war. At this critical juncture, with Germany being eviscerated under Allied air attacks, the Germans developed a decisive air weapon in buzz bombs and guided missiles. But, again, while Nazi science and industry was able to produce these weapons, the military high command failed to provide an organization to use these weapons effectively. No method was developed to employ V-1s suddenly, *en masse*, at a decisive point and to exploit the effects of such an invasion. Instead, buzz bombs were fired haphazardly at London, to the great anguish of that metropolis; some aircraft were diverted from the Reich to V-1 nests, but there was little effect on the military situation. The same thing happened with the V-2. A weapon with decisive potentialities was used ineffectually because of organizational weakness.

In the Army Air Forces we have the problem today of organizing most effectively to obtain maximum power from air-

craft. Airpower consists of the effective use of trained men operating efficiently designed machines of destruction in the air. The Army Air Forces trains its men for three primary missions—defense of our territory, strategic attack on the sinews of enemy industry, and cooperation with surface components of the Armed Forces.

The Tactical Air Command was organized in April 1946, to accomplish the last of these three missions. We are now engaged in the task of building an organization that can best utilize the advances in airpower that are being made at a breathtaking pace.

The XB-45. (AAF photo.)

Our method of building that organization is evolutionary. Airpower reached its peak over Europe in the past war. Originally, tactical airpower existed as an adjunct to ground commanders. Tactical airpower was viewed as a corps, division, or regimental weapon—flying artillery to be used by the ground commander to facilitate the advance of his troops. The fact that airpower is of such decisive influence on the battlefield that the first responsibility of an air force is to win air superiority was not appreciated until the Desert Air Force was organized under the British in Africa. The Allied air effort had been frittered away in dibs and dabs instead of being used as a cohesive force. To remedy this situation, the Desert Air Force placed all tactical airpower under an air commander who could control the time, place, and weight of an assault. During subsequent fighting, this pattern of organization was tested, refined, and improved. As it became more proficient, tactical airpower assumed greater responsibilities. The employment of tactical airpower was recognized in United States doctrine in July 1943, when Field Manual 100-20 prescribed that it was the responsibility of tactical airpower to gain air superiority, interdict the battlefield, and participate in the ground engagement. In 1945, we saw tactical air force at such a peak of power and versatility that it could not only accomplish its designated functions, but it could afford flank protection against hostile ground forces for the Third Army, and it could carry on full scale offensives against ground objectives by the use of airborne armies.

The organization that was so successful in Europe is the basic organization of the Tactical Air Command today. As our purpose is to achieve the best possible cooperation with the ground forces and to perfect and refine the techniques of such cooperation, Tactical Air Command Headquarters is situated at Langley Field, Virginia, a scant five miles from Army Ground Forces Headquarters, located at Fort Monroe, Virginia. These headquarters were brought into close juxtaposition in May 1946, to facilitate the close planning that is necessary between ground and tactical air units.

Under the Tactical Air Command there are two Air Forces—the Ninth, with headquarters at Greenville, South Carolina, and the Twelfth, with headquarters at March Field, California. The Ninth is located to participate in joint missions with the First, Second, and Third Armies, and the Twelfth to aid and abet the Fourth, Fifth, and Sixth Armies.

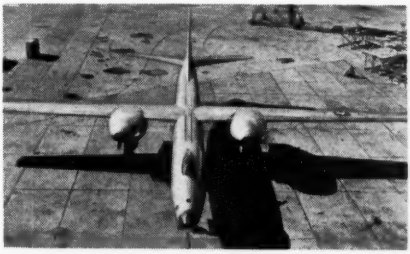
The Ninth Air Force is now composed of one fighter group, two troop carrier groups, one composite group, a Photo-Reconnaissance group and a Tactical Con-

trol group. The Photo-Recon group is shy one squadron which is attached to the Twelfth Air Force. In addition, the Twelfth Air Force has one fighter group and one light bomber group. It is our aim in the Tactical Air Command to bring the two air forces into balanced strength as soon as possible. We expect to accomplish this with the activation of new units in the near future.

Economy has forced us into an organization that is not ideal. We would like to have all troop carrier elements centralized in a separate air force, as airborne operations to be most effective should be under the direction of the theater commander. However, to save overhead costs of another air force, troop carriers were assigned to the Tactical Air Force.

When this activation period is complete, we will have two air forces capable of undertaking independent missions anywhere in the world. Our tactical air force will be a self-contained unit with all the elements necessary to conduct its operations and administration without assistance.

The efficiency index of the Tactical Air Command is on the rise. The high water mark of tactical airpower was reached in Europe in 1945, then, along with other units of the Air Forces, Army, and Navy, completely collapsed in the face of frantic demobilization. After the bulk of demobilization was completed, we were engaged in finding men to man our tactical units and, throughout 1946, we were largely preoccupied with training individuals to perform their jobs. This period is now behind us. Although the problem of replacement and training for individuals will always be with us, the Army Air Forces school system is now operating effectively and we can expect to receive trained replacements for the normal peacetime attrition. Consequently, our main task today is unit training. We have embarked upon an intensive program in the Tactical Air Command to regain the organizational know-how we acquired in the last war and to accumulate, through experience, new knowledge to handle new equipment and developments. All our emphasis is directed upon training the tactical units to perform as combat organizations. We insist in our fighter groups that our elements fly as elements; our flights as flights, and our squadrons as squadrons. We insist that our service groups operate alongside the tactical groups and participate with them in all field exercises. We insist that our administrative elements be geared to support the demands of tactical operations.



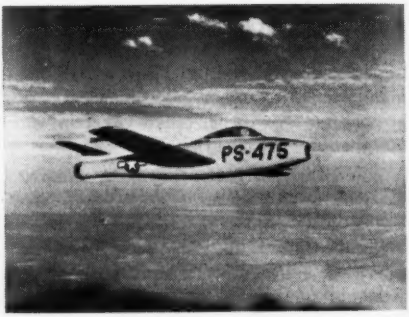
The XB-46. (AAF photo.)

We are flying under combat loads and combat conditions at all times. We do not intend to strip our aircraft of guns and bombs to lighten their weight. We do not intend to fly at low altitudes where it is more comfortable. In our training we use the same type equipment and fly the same type missions as will be required in war.

Unit training is being accelerated by participation in maneuvers and exercises wherever possible. In November, the Twelfth Air Force participated in an amphibious exercise with the Fifth Fleet and Sixth Army, conducted near Los Angeles. The Ninth Air Force is now receiving unit training by operating an Air Indoctrination Course at Lawson Field, Georgia. This course, which demonstrates the op-

eration of a tactical air force working in conjunction with a ground army, has given us an unequaled opportunity to obtain training under conditions as near to actual combat as we can simulate. In addition, we are undertaking a joint mission with the Army Ground Forces in transporting and resupplying ground units in an Alaskan exercise. Next winter we expect to conduct squadron training, employing two troop carrier squadrons in transporting and supplying ground force units in the North. We also plan to place either a photo reconnaissance or a fighter squadron in Alaska to gain operational experience.

Lockheed P-80. (AAF photo.)



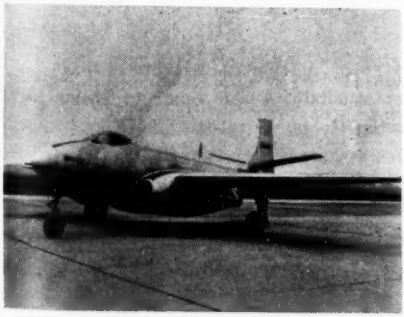
Republic P-84. (AAF photo.)

It is our desire to participate in every exercise that we can. We believe that any operation, whether it be an amphibious assault, or a ground maneuver, requires the presence of tactical airpower, and we are vehement in our declaration that we shall be present at all such exercises in order to sharpen our ability to perform missions we shall be required to do in time of war.

We are occupied with finding the solution to a number of new problems in the Tactical Air Command. One of the foremost is new equipment. We came out of the war flying P-51, P-47, A-26, B-26, C-46 and C-47 type aircraft. All of these are obsolete with the exception of the A-26. Our conventional reciprocating engine, propeller-driven fighters are being replaced by jet-propelled P-80s and P-84s. Our troop carrier aircraft are being replaced by C-82s, Flying Boxcars, with greater range, carrying capacity, and better loading and unloading facilities. In the near future, our medium bombers will be replaced with jet-propelled models. These new aircraft, which in most cases double the performance of our old equipment, bring with them a number of new problems. For instance, the First Fighter Group has been service-testing P-80s. Initially, we had an airplane that could fly, and fly fast and high, but we knew nothing of it as a military aircraft. We needed to find out if it could shoot, if it could strafe, if it could dive-bomb. We needed to know if we could use it on interception, escort, or ground cooperation missions. We had to examine our ground control units to determine if they were adequate to direct P-80s in a combat situation. It was necessary to revamp our weather forecasting to accommodate aircraft that customarily fly between 30,000 and 40,000 feet. We needed to know if our construction battalions were adequate to the task of providing landing strips for jet aircraft, which need longer and better runways that we were accustomed to in France or the Pacific.

By flying these aircraft operationally, we were able to get the answer to many of these problems and to incorporate our answers into tactics and standard operating procedure. We know that the P-80 is a hard shooting, easily controllable craft, good for ground support. We have discovered it has excellent dive-bombing characteristics. We have found out that it is unexcelled for photo-reconnaissance work. But some of our problems are yet unsolved and as we improve and expand our capabilities we uncover new problems for every one we leave behind us.

Deficiencies in wartime operations are receiving close scrutiny. One of our most glaring faults was our inability to conduct night operations. We were able to stop the Germans cold in the daytime, but at night we were a flop. At best, our night attacks constituted a nuisance. To

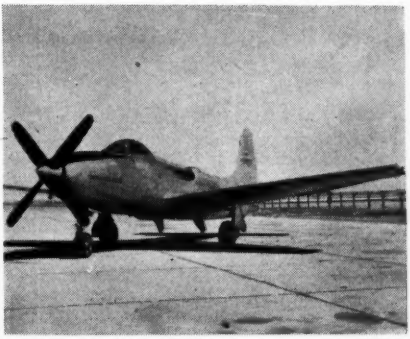


Bell XP-83. (AAF photo.)

solve this problem we have designated one group—the 47th Light Bombardment —to devise methods and procedures so that we can successfully attack around the clock. The problems of successful night bombing being studied include low level navigation, identification of targets, and precision bombing on pinpoint targets.

Through these experiments we expect to open up new vistas which will indicate solutions so that we can seal off a battlefield from outside support whether it be dawn or dark.

Our attention is also turning toward the Arctic. We are capable today of conducting active operations in a Polar region if



Consolidated Vultee XP-81. (AAF photo.)

we have prepared installations. At the present time these are extremely limited.

Many questions remain to be answered concerning the pattern of warfare under extreme cold weather conditions. We are interested in finding out how ground units propose to fight in the Arctic. It does not appear that divisions will plant themselves in the snow and conduct warfare along the traditional lines of warm weather battlefields. Rather, the trend seems to be that our military operations in the Arctic would be counteroffensive in nature. If an aggressor established bases in the Arctic, tactical airpower would have the job of neutralizing those bases, transporting airborne armies for assault, and supplying ground troops. To accomplish our tasks in Polar regions, we must find out how much we lose in efficiency of men and machines in the cold. We must investigate supply and transportation and our capability of providing adequately for a field army by aerial transport. We must know the hazards to personnel, methods of air rescue, medical requirements, and a thousand and

one other item about the unknown North.

The Tactical Air Command today is on its way to combat efficiency. It is our aim to reach and surpass the peak we attained in World War II. Our greatest task is to explore, inquire, and investigate new facts, new developments, new ideas, and then to adapt our organization so that we can take military advantage of the scientific advances that are being made today. We must keep our organization sensitive to change so that it is adaptable to modern conditions, and, if we are faced with a battle for survival, we shall be the fittest.

We should organize to provide parity for air power. Air power has been developed to a point where its responsibilities are equal to those of land and sea power, and its contribution to our strategic planning is as great. In operation, air power receives its separate assignment in the execution of an overall plan. These facts were finally recognized in this war in the organizational parity which was granted to air power within our principal unified commands.

President Harry S. Truman

The War Department Spreads the News

Lieutenant General J. Lawton Collins, *General Staff Corps*
Chief of Information

This article is abridged from an address delivered by General Collins before the students of the Command and General Staff College.—The Editor.

THERE are three main elements in the business of furnishing information about the Army. First, we have our dealings with the public at large—direct public relations. We frequently forget the next part of our program, and that is our relations within the Army itself—between the various elements of the Armed Forces and with our men, which I like to regard as our internal public relations. Finally we have our relations with the Congress, which is a very important element of our public relations.

Relations with the Public at Large

The main point to make about our general public relations is that we will have good public relations if we have a sound military program, ably administered with common sense. Good public relations cannot be created by any high pressure campaign such as, perhaps, a business firm will put on in selling a new car. Our public relations will be good if we have a good program, if we make that known to our public and if we administer it with common sense and judgment.

At the same time, we have to take the public into our confidence, and we have to share the responsibility with the public, making it clear that this is their Army, and that the problems of national security far transcend the interest and capacities of the Army, the Navy, and the Air Forces alone. The ramifications of national security are much too profound for that, and we must make it clear to the people that national security is their responsibility as well as ours. We cannot do that if the Army again recedes into its shell as it did after World War I.

If we go back to living alone on army posts, paying no attention to the public, having nothing to do with the public at large, then the public is going to say, "The Army be damned," and they would be right in saying so.

That means, then, that the Army has to participate in the community life of this nation wherever we are, whether we are stationed on any army post or whether we are out with the National Guard or the Reserves. We must make it clear to the people with whom we live that we are interested in what they are doing, that we are interested in community problems and that we are willing to take an active part in them. Such things as the Community Chest, the American Red Cross drives, the local aid to various organizations, the handling of boys clubs—those activities which are the essence of community life—all of us must take an active part in them if we want the public to believe that we are interested in them so that they will be interested in us. That is just plain common sense.

The next major point is that we have to take a positive approach in our public relations rather than a negative one. We are proud of our program, we are proud of what we did during the war. I, for one, am through with alibing and offering any excuses for what we did or what we intend to do. We must come right out and make clear to the people that national security is our field; that we have a broad program of which we and they can be proud; that there is nothing sinister about it; nothing about it which cannot stand public scrutiny.

Organization

Take a look at the organization we have for Public Relations, or Public Information as we now call it. We have in the War Department three divisions of the War Department Special Staff: the Public Information Division, the Troop Information and Education Division which handles our internal public relations, and the Legislative and Liaison Division.

My job is a coordinating one, a policy making one. As Chief of Information I do my best to keep out of the actual operations of these three divisions. I am supposed to sit in at the time policies are being made in the War Department so that if there is something new that the War Department intends to do, I can raise the question, "Well, have you thought about this from a public relations standpoint? How is this going to effect the public at large? What is going to be the effect of it on our men? What is Congress going to say about this? Perhaps it needs some modification from that point of view. If it must be done and we think there may be some adverse reaction, how can we inform the public or our troops, or the Congress ahead of time as to what this is all about?"

In other words, we are endeavoring to prevent the fire rather than to try to put it out after the conflagration has started. That is one of the successes of good public relations. We are endeavoring to consider public relations at the time policies are being made rather than later on.

The Public Information Division of the War Department today has actually fewer men than it had just prior to the war. There are about forty officers and some sixty civilians in the Public Information Division. We have direct access to all of the news agencies of the country and as news is centered in New York, Washington and one or two other places in the country, and since we are sitting right in Washington, the seat of Government, it is essential that there be an ably-organized and ably-administered Public Information Division in the War Department.

We are endeavoring now to get the divisions of the War Department to let the Public Information Division know, early in the game, what is being planned, what is about to "break." It takes a man—it takes a small section in fact—to get around and get that information, because too frequently the various staff divisions become so absorbed in what they are doing that they do not let the public information people know ahead of time. That is one of the key things we have to do. Then we furnish information directly to the press, either through press conferences or through press releases—"hand outs" as the newspaper people call them—and we endeavor to make it clear to all of these people that they can get information by calling us at any time.

Most of the newspapers and all of the big wire services maintain press men in the War Department in our press room where we have ticker tape service for them. We are doing everything we can in the War Department to get information to the press—factual information—as readily as we can. But, the War Department cannot do it all alone and it would be a decided mistake if we tried to run the whole public information program of the Army from Washington.

We have, therefore, been doing our best to decentralize to the army commanders and to the theater commanders overseas. We have provided in Tables of Organization for a small public relations section in each unit, from the division up. It is essential that every such unit have a small press section with photographer and other means of getting out the news. We try to have the people in the fields "break" the news stories right on the spot rather than refer them to Washington. If something happened out in the field, under the old system left over from the war when censorship was in force, nobody in the field would say a thing, and then the news people would have to call Washington.

We are trying now to have the people in the field give out factual information as promptly as possible whenever a story develops, rather than to wait for twenty-four hours, have a bad story "break" and then try to counter that story. You can never get a retraction publicized to the same extent as the original story. At each army headquarters, and in Europe, Japan and Korea there is a small public information section. In our larger units at home, and at every station wherever it can be done, we have at least one officer to handle public information with the local communities; usually this has to be in addition to his other duties.

Civilian Advisory Committees

We cannot, however, depend solely on our own organization, particularly out in the field. In following our general thesis that we want to share the responsibility with the public for what we are doing in the Army, we have been urging our army commanders to form Civilian Advisory Committees in each of the major communities in their army areas. This program has been well under way now for several months and is producing splendid results. In each major community, we are endeavoring to organize groups of people covering the major fields of public interest. There may be a woman's section; a subcommittee of church men; an industrial group; a labor committee; a committee of advertisers and newsmen. We suggest that the chairman of each of those sub-committees sit on a central advisory committee for the army commander for that particular community, and that one of these men be elected as a chairman by that group. If the army commander has some problem in his area, or if he wants to get a sample of public opinion, all he has to do is write to the committee chairman and the committee chairman will have his subordinates make a survey or take appropriate action on the matter in question.

This system has produced definite results in one of our major spheres of activity—recruiting. In one of the army areas where this system was first put into effect, the number of recruits during the past year has been just about double the number enlisted in an adjacent area with essentially the same population. In the first area they have organized over 150 of these committees. In the other area they are just getting under way now. I am perfectly confident that the great difference in the recruiting results can be traced to that one item alone. The Civilian Advisory Committees in this one army area have backed our recruiting, backed our publicity on recruiting, have stimulated the various veterans associations and other groups to go out and try to get recruits for us. The value of this system is proved by the fact it has produced double the number of recruits that the adjacent area has although the population in the two army areas is exactly the same.

We are asking these groups to present for us our plan for Universal Military Training. We furnish them information sheets from the War Department. We also furnish our army commanders with information sheets which indicate what

the War Department is doing on all major matters. This is a very essential service to furnish to the army commanders and the advisory committees, because in the smaller communities the amount of space put into the morning newspapers or the weekly newspaper on many stories of national significance is very small. In the metropolitan newspapers, the whole speech of the Secretary of War will be printed, but by the time it gets down to the small town, the Associated Press dispatch on it is only two paragraphs. There are many questions to be asked which are not answered in such brief stories, so we are sending out to the army commanders and to these civilian advisory committees the whole text of the major speeches and the statements before Congressional committees that are made by the Secretary of War or the Chief of Staff and other War Department representatives. In that way information on our actual policies and actual plans can be disseminated down through these advisory committees to all of the various agencies that affect public opinion right out in the "grass roots." That is very important.

We think then that this policy of sharing our responsibility with the public at large can be done in the public relations field by means of these advisory committees. But we cannot depend on Advisory Committees alone. Army commanders and senior officers in the field, whether they be ROTC or National Guard instructors, must themselves get out and talk to the various groups that afford them an opportunity to speak, the Rotary Clubs, the American Legion, the Veterans of Foreign Wars and other such organizations. Through the Information sheets that we send them, and through the copies of speeches that are prepared by the War Department, their job can be greatly facilitated.

Answer Criticism

The other big thing that we have endeavored to do in the War Department, and which we are passing along to our field commanders, is to answer all criticism that is leveled against the Army when it is not based on facts. I said earlier that we will have a good public relations if we have a good program, and if we administer that program with common sense; but if we do not do it that way, we are going to get bad public relations.

If a bad incident occurs and it is something where we are vulnerable, we say we are going to spread the truth right out in the open and take it and not try to cover up or alibi. But if, on the other hand, we get a story either from a press dispatch, or from a radio commentator, or from a news analyst in which the army is blamed for something of which it is not guilty, we are through with taking it lying down. We answer all such charges now as promptly as we can with the actual facts, and it has produced good results.

We have obtained retractions from prominent columnists and many other newsmen, and we are gradually getting them to the point where they believe us when we say, "If you get a story that there is any question about, and you are not sure don't 'break' into print and blame us—give us credit for a little common sense. Call us up and we will give you the facts." As a result, a good many of these people who used to hit us regularly every week now actually call us up ahead of time. A major commentator recently called me over the week-end at home about a certain item. He said, "General, I have a story here that seems pretty lousy to me. You have told me that you will run it down." I said "All right, I will." I called the Quartermaster General's office routed somebody else out in the middle of a Sunday afternoon, and in two or three hours of checking in various places, obtained the facts on this particular story and gave it to this man. His alleged facts were

wrong, so he never printed his story. But if he had, it would have taken weeks to have countered the thing that he would have said.

Gradually we have convinced the news people in Washington that we mean business, that we are not going to try to cover up, and that we will give them the facts. That is the same sort of thing we want done out in the field, at army headquarters or any other place. If somebody gets shot on an army post, instead of telling the newsmen they cannot come on the post—investigate the incident promptly and give them the facts about the matter right then and there. You cannot prejudge it, but at least you can give them the facts, and it is far better to give them the facts as they happen than to say, "You know you can't come on the post. You can't take a picture of this. You can't do this. You can't do that." It simply stimulates curiosity, and anybody who tries to beat a good American newsman just does not know what he is up against—he will get a story of some kind, and it is far better to have him get a factual story than just any story, because nine times out of ten if you try to beat him he will "bat you over the head."

Procedures

That, then, is the general policy that we are following. Now let us consider some of the specific things that we have been endeavoring to do in order to get over our program to the public at large and the procedures that we are following.

Some months ago, the War Department General Staff began a complete review of our major policies and our major programs so that we could formulate a legislative program for this session of Congress. After many rehearsals and much discussion, we formulated a good general program.

We started out by presenting that program, our overall estimate of the situation and our overall program, to the President of the United States. He was very much impressed. We presented it to the Bureau of the Budget, to the major committees in the Congress that deal with military affairs, and to as many groups of civilians of high caliber as would listen to us. We have outlined it to representatives of industry and the major representatives of labor. We have called in the top newspaper editors and publishers east of the Mississippi River and some from farther west. We have taken it out to the National Grange, a traditionally pacifistic organization. We have spoken before the Association of American Colleges in Boston. We had a meeting in Chicago in which we presented our overall picture to the top industrialists of the United States. We are doing our best to reach every representative group in this country that will take time to listen to us. It has had a profound effect upon these men whom we have addressed.

We have printed essentially what we say, and we are asking the army commanders to do the same things in their own local communities to any group that is interested. In this way we are endeavoring to present to the people of this country what we estimate the situation to be from a military point of view, what a possible war may look like, and the needs of preparation for such a war; why we have to have armies of occupation overseas, and why the strength of the army has to be 1,070,000 now; why we need an M-day force of 1,750,000 in the event of a national emergency; the importance of the National Guard and the Reserve in that program; the ramifications of the extension of Selective Service as opposed to no extension of Selective Service; the problem of raising recruits in the army; and finally a Universal Military Training program which is essential for our civilian components.

We are endeavoring to have our army commanders organize exhibits and demonstrations in their areas where people can

come to an army post, not just on Army Day or during Army Week, but at various periods throughout the year, so these representative people can be brought in and shown what we are actually doing in the Army today, what our problems are first-hand. Much interest can be aroused with a good program, ably organized. We have had advice from many top-notch civilians in organizing this. We hope to bring such groups to installations and units such as the Command and General Staff College, the 82d Airborne Division, and the Second Armored Division.

At Fort Knox we have an experimental unit which is working up procedures for Universal Military Training. It has come off extremely well so far. Now we are going to try to get various groups of civilians who are against Universal Military Training to go to Fort Knox and see for themselves. We say, "Come out and see if we are ruining the morals of these boys. Some of them are going to church for the first time in their lives. We are teaching something of citizenship to them. If you do not like this, tell us what to do about it. Where are we wrong? What is sinister about this program? You tell us. It is your responsibility as well as ours."

We have organized trips to Europe and to Japan and Korea. We have sent over there some of the top news people of the country. We are going to send as many Representatives and Senators as can take time out to go see for themselves. We are picking not just people who will say, "You are doing a great job." We far prefer to get the ones that condemn us all the time. Let them see first-hand. Almost without exception everyone of them has come back enthusiastic about the job we are doing, thoroughly sympathetic with our problems, and insistent upon making the people of this country understand what these problems are.

Command Relationship

I would like to touch next upon the relationship between the Public Information staff officers and their commanders in the field and their mutual responsibilities for the execution of this program of Public Information. First, the Public Information officer is going to be of use to his commander only if the commander takes him into his confidence, discusses his problems with him periodically, and does it directly and not through the medium of the Chief of Staff or somebody else. Public relations is too much an element of command itself to delegate it that way. The commander himself actually sets the tone for the public relations of his command. We have been blessed in the Army with two great Chiefs of Staff in succession who have a keen sense of the importance of public relations. The best public relations the Army has ever had were established by General Marshall himself, and are being continued today by General Eisenhower.

The same thing is true in the field. If the commander is alive to his responsibility for establishing good public relations, he will do something about it, and he will talk with his Public Information officer and give some consideration to the wishes and the interests of the public at large. I could relate case after case of ridiculous handling of public relations just based on commanders not using their heads and not giving some consideration to the people with whom they associate out in civilian life.

We are trying to develop good Public Information Officers for the Army. We are trying to develop throughout the Army an appreciation of the Public Information Officer's job. We have established at Carlisle Barracks, Pennsylvania, the Army Information School and we are training Public Information Officers and Troop Information and Education Officers there in courses that last about three months. If I had my way, if we could afford the time and the funds, I would have every officer

in the Army take a course at Carlisle, not with a view to making them either Public Information Officers or Information and Education Officers, but to bring home to them some of the problems of running the Army of a democracy on which public opinion has such a tremendous impact. We will not get money from the Congress, sound legislation or support from the people, unless all of us understand that this is the Army of a democracy, and that we must understand the public point of view and have some means by which we can make the civilians understand the Army point of view.

At Carlisle we are trying to train Public Information Officers. We are sending them out in the field. We have asked the army commanders not to stick them on Public Information jobs forever. That is, we have asked the War Department not to do that. They go out in the field and actually do Public Information work, but we do not want these officers to be channeled in Public Information work for the rest of their lives. In my judgment one of the prime bits of training for high command that I could recommend would be to go to Carlisle and take that course.

Through the G-3 of the War Department, we have had brief courses on Public Information introduced into all of our schools—at the Military Academy, Benning, Sill, Belvoir, Leavenworth. We have studies at the National War College on the influence of public opinion on the conduct of war. I am hopeful that in this way we will get our younger officers, as they come up, to appreciate the importance of public opinion and its effect on the Army and to learn at least something of the techniques involved.

Internal Public Relations

Now let us look at our internal public relations.

We had some eleven or twelve million men pass through the Army during the war. If we had done a first-class job of explaining the Army to these men, of making them appreciate what the Army was doing and some of the reasons why, we might have had eleven million advocates for the Army and national security when they returned to civilian life. I know the difficulties we had during demobilization, but I ask: "Were there not things that we might have done better that would have made all these men who served with us advocates of the Army instead of having a large number of them very venomous critics of the Army?" I am hopeful that as the years roll by these men will forget some of their particular irritations and appreciate the great privilege they had of serving in the Army during the war, and I think that as time goes on they will become our advocates.

But we have our internal problems now in the Army. If we can sell the Army to the soldiers who are members of it, we are likely to get more men to reenlist, or at least when they go back to civilian life they will tell the boys on the street corners, "Sure the Army is a good thing. Go ahead and take a crack at it for a while." In other words, we have a selling job to do within the Army itself, so far as our relations with our men are concerned while they are with us.

We have a job, on another plane, between officers of the various branches of the Army and between the various components of the Army. There is no question but that civilians get an adverse impression whenever they hear a fight going on between an Air Corps and a Ground Force officer, or between an artilleryman and an infantryman. Those old traces of branch jealously create bad public relations. I am convinced that this war went a long way toward breaking down the old suspicion between branches, between the line and staff of the Army. But we have to do something about it, and I for one hope that before long we will commission all our officers in the Army, not in the Field Ar-

tillery, or the Infantry, or the Quartermaster Corps.

I feel exactly the same way with reference to the Air Forces, the Ground Forces and the Navy. This business of "Who won the war?" is bad public relations. Many civilians say that whenever the Army, the Navy or the Air Force get together, the first thing you know they are fighting among themselves.

There is plenty of credit for everybody on who won the war. We all won the war. No branch of the service won the war. It was won by teamwork, by cooperation. That is what did it, and we all know it. When you meet people in civilian life and the question comes up, make that point. It will go a long way toward convincing the public that we are breaking down those jealousies. That is one of the big things I hope to see come out of the unification of the War and the Navy Departments. I feel certain we will get some legislation in this Congress to that effect. It may not be exactly what we would personally advocate, but I am confident we are on the right track, and that there eventually will be a single department of national security.

If we can produce a new crop of officers of all the branches and arms who are devoted less to their own particular branch of the service than they are to the general problem of national security, we will go a long way toward convincing the public at large that we are not acting from a selfish interest.

There is one other aspect of internal relations which I want to touch upon. That is the matter of loyalty. One of the prime military virtues is loyalty. Unfortunately it is frequently a habit of various headquarters throughout the Army, when a directive is received from the next higher unit to say, "What are they thinking about now?" Anything that the top fellow does is all wrong. At the same time, the same thing is being said in the next unit below that one. Everybody knows more about it that the fellow up above, and unfortunately too many of our people in conversations with civilians consistently degrade their next higher echelon of command, the "big brass."

That is bad public relations as well as bad military policy. Loyalty is something that we have to re-create in our officer corps. Let us go back to the old system where an officer, though he evaluated an order, and might have his own private opinion as to how he would do it, at least realized that the fellow up above probably knew more about it than he did, had weighed the pros and cons on this thing, and that the job is to carry out those instructions gracefully and loyally. That is something that will help all of us in our general relations with the public.

Troop Information and Education

The Troop Information and Education program was designed to orient our men as to the Army itself and the mission of the army throughout the world. Unfortunately, during the war, the Information and Education program got off to a bad start in certain areas.

Let the senior commander realize that this business of influencing the thinking and the indoctrination of our men is one of our prime responsibilities. Some years ago, the War Department set up a Morale Section. I was one of those who yelled loudest and longest about it; to that extent, perhaps, I violated the principal of being loyal. I said that I was the morale officer in my unit. The discipline and the morale of my outfit was something I was not going to pass off to any staff officer; that was my business. I would not surrender that to anyone. That is the point of view that we would like to have in the Troop Information and Education program today. You may not find that down in the manuals anywhere, but the essence of it is for the commander to take the responsibility for orienting his men.

It has been my experience as company commander, and right up the line, that if you only take the men into your confidence, tell them what you are about, you will have no difficulty with American soldiers. If you will explain the reason why—what you are driving at—they will meet you more than half way every time.

That is what I would like to see as the basic philosophy of our Troop Information and Education Program. We must orient our men, we must appreciate the tremendous importance of doing that.

We are trying to get the orientation hour out of the clouds where some of the Information and Education people put it in the earlier days of the war. These discussion periods are very much worth while, but they are going to be good or bad depending upon how ably they are led by the officers in charge. If the officers do not believe in the program, the discussion periods will be sour hours that the officers and men will simply waste in boredom. Let us inform our men about their army, its missions and responsibiilities and their part in making this country genuinely safe for our form of democracy.

We have changed the policy in the handling of our soldier newspaper. We say that the soldier papers are army papers. The Government pays for the newsprint, pays the salaries of the workers, pays for the editing and distribution of the paper. Army papers are designed to enhance army morale, not to tear it down. There must be the same relationship between the staff of a soldier paper and the commander as exists between the editorial staff and the reporters of any newspaper and the publisher. We are not suppressing the freedom of the press then if we set the policies for our soldier papers.

These then are our general policies for the Troop Information and Education Program. We are endeavoring now to get the information program into the hands of the commanders and through their Information and Education officers to make it a practicable program which will inform and indoctrinate our men in our mode of life. I have not covered the educational part of the Information and Education program, as I have limited our discussion to the field of information.

Legislative Program

Let us now turn to the legislative part of our information service in Washington. We elect our representatives in this country, and the people in the Congress reflect the point of view of our people at home. If the people at home believe the army program is sour, you are going to have sour notes up on the Hill. And the people at home are going to believe the program is sour if it is sour. If it is a good program, you are going to have good public opinion on it at home and support of it on Capitol Hill.

Another of the duties of the Legislative and Liaison Division is to prepare legislation for the Congress at their request. Take, for example, the matter of revising the promotion system of the Army. The Congress expects the War Department to submit to them our ideas of what the promotion system ought to be. We may be asked to draft a bill which is sent to the Senate or the House Armed Services Committee. Hearings are held on it, and witnesses are called to debate the thing pro and con.

We have to coordinate the preparation of the testimony submitted by War Department witnesses. It is the War Department policy that a witness, going before one of these committees, has to support the War Department program. That is only common sense. But at the same time, we do not attempt to throttle the personal opinion of any witness, so if a man is asked the direct question, "What do you think about this provision?" that officer is entirely at liberty to say, "Well, my idea is so and so, that is my personal

view; the War Department view is so and so for such and such reasons." That is the general approach we have to these Congressional committees and it is only by giving them full factual information that we can get their support.

Such is the Public Relations or Information Program of the War Department. We believe it is based on a sound approach to the public, a proper evaluation of our internal public relations and, I hope, on a good relationship with the Congress for a well-rounded program of National Security.

The Army is an institution performing a public service. It can perform that service only in proportion to the degree of public support it attains through a forthright and aggressive policy of honest relations with the public.

General Jacob L. Devers

A war of the future will require a more comprehensive and a more rapid mobilization than we have ever faced before; that this will require us to train more men in a shorter time than ever before; and that the only way we can shorten the time is to train them before the advent of war. This requires peacetime military training of civilians in large numbers.

Former Secretary of War Robert P. Patterson

The Division War Room in the Field

Lieutenant Colonel W. S. Rosson, *Infantry*
Instructor, Command and General Staff College

CONTROL is one of the salient factors contributing to success in battle. The commander who is able to exercise a high degree of control has paved the way for a fuller measure of coordination, greater flexibility, and, above all, decisive results in the shortest possible time. Furthermore, he has paved the way for maximum efficiency on the part of all elements of the command.

Without digressing into the subject of control, let us note at the outset that control in battle is best gained in three ways:

1. Personal visits by the commander with his subordinates to insure that they understand his plan and are carrying it out to his satisfaction.

2. Use of an efficient system of communications that permits prompt transmission of orders and reports.

3. Organization of the commander's headquarters in such fashion as to insure minimum delay in receiving and evaluating reports, and in preparing and issuing orders.

It is on this last feature contributing to control that we shall focus our attention. We shall consider for illustration the headquarters of an infantry division, and outline a method by which this headquarters can best be organized for serving the commanding general in battle.

We must note at this point that the command post of the infantry division does not function in the relatively sedate manner characteristic of corps and army command posts. The division general and special staffs emphasize greater informality, rapidity of action and close teamwork in expediting the decisions of the commander. Division planning is normally confined to short periods, and the play of battle results in rapid, unexpected movements of the command post. For these reasons the division command post resembles more closely the regimental command post, and must be organized to function with speed and flexibility.

It is not our purpose in this article to analyze the T/O&E of the headquarters of an infantry division with a view to reshuffling the personnel. We shall, instead, consider a plan whereby the existing headquarters can be welded together into a more efficient team.

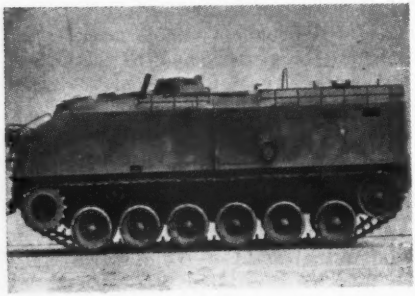
Let us narrow our attention to the forward echelon of the headquarters—that portion which makes up the commanding general's command post in operational situations. The exact composition of the forward echelon will always vary between divisions, but the following is a typical composition upon which we shall base our discussion:

One-half of Hq Co (including messes)
Signal company less rear echelon
Command Section
Chief of Staff Section
G-2 Section
G-3 Section with air communications
G-4 Section

Miscellaneous detachments including MPs and aid station.

Included also in this listing is a liaison section under the chief of staff or G-3, plus artillery and engineer liaison officers with the G-3 and G-4 sections respectively.

This command post set-up has one serious disadvantage over and above any that may be present in its composition. This disadvantage is the necessity of displacement by shuttling due to lack of sufficient T/O&E transportation to motorize the entire establishment. The T/O&E actually contemplates full motorization, but it is a fact that existing transportation is insufficient to lift all organic personnel and equipment together with the extra personnel and vital impedimenta connected with the headquarters. Almost as great a disadvantage as lack of ample transportation is the absence of duplicate equipment which would permit the installation of a new command post prior to displacement, and eliminate loss of efficiency inherent in shuttle displacement due to the length of time the command post is inoperative.



The Armored Board has recently considered conversion of a full-tracked, armored personnel carrier for use by command post installations. It is possible that this vehicle, illustrated here, may become available in place of vans or converted trucks and trailers.

The first alteration that should be made in the command post, then, is to provide 100% mobility. The second alteration is to devise a method of accomplishing the *effect* of duplicate equipment without actually incurring the expense and unwieldiness of duplication.

The first alteration involves only a simple addition that can be handled easily in battle by requesting an excess in transportation. Six additional 2½-ton trucks of which three have trailers will motorize all personnel and equipment, and eliminate the shuttle displacement.

The second alteration involves a somewhat radical departure from our present system of tent headquarters, and is designed to put the command post installations on wheels. It can be accomplished very efficiently by converting issue trailers into office trailers, by utilizing vans, or by converting 2½-ton trucks into offices. The following should be installed in such wheeled offices:

CG (van)
Asst Div Comdr (van)
Chief of Staff (van)
G-2 (in ¼-ton trailer)
G-2 section (van or large trailer)
G-3 (in ¼-ton trailer)
G-3 section (van or large trailer)
G-4 (in ¼-ton trailer)
G-4 section (van or large trailer)
Sig O (in ¼-ton trailer)
Msg Cen, Swbds (in ¼-ton trailers)

This second alteration further requires:

1. Organization of all installations for prompt and efficient loading on trucks and trailers.

2. Utilization of the signal company's ability to displace without necessity of shuttling.

3. The organization of a WAR ROOM, the entire equipment for which can be loaded in one 2½-ton truck and one 1-ton trailer.

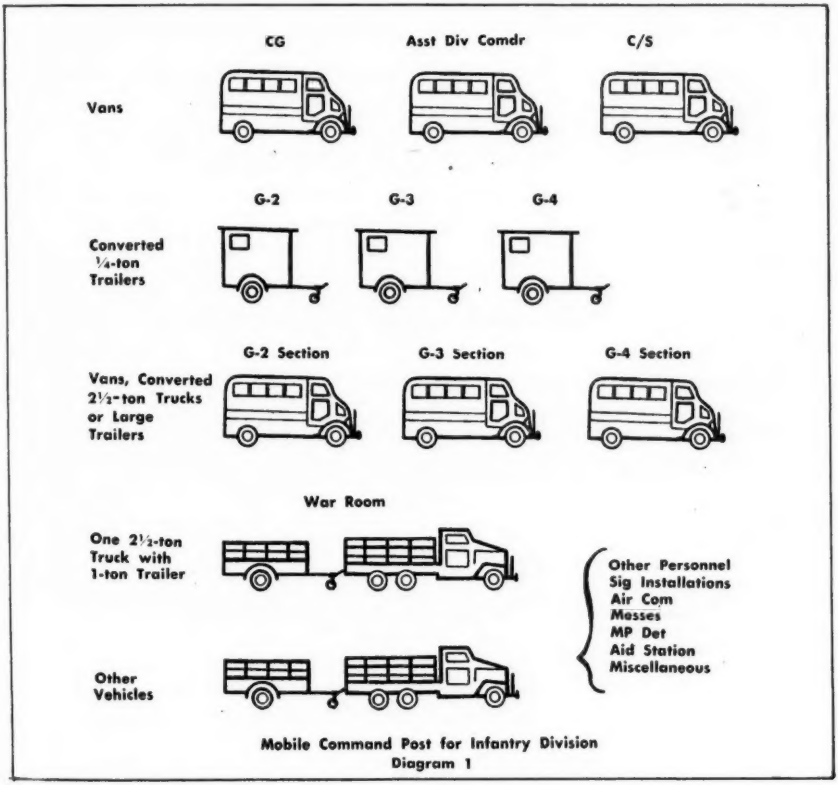
The war room is perhaps the most significant innovation in command post technique that was developed during the past war. Credit for this installation goes to Lieutenant General L. K. Truscott, Jr.,

(then Major General), who devised it for his 3d Infantry Division command post in Sicily in 1943.

The war room owes its birth, on division level at least, to this division commander's dissatisfaction with the necessity for wandering about his command post from one section to another in order to ascertain the latest situation and to conduct his operational business. It became evident to this commander that such a method was not only cumbersome, but indicated a lack of coordination and close teamwork between staff sections.

The immediate solution was to charge the chief of staff with maintaining consolidated situation maps and reports for the commander, but this practice overburdened the chief of staff and failed to eliminate the disadvantages of the physical separation of the staff sections. Accordingly, the following simple reorganization of the command post was made to overcome these obvious deficiencies:

1. The G-2 and G-3 sections were split roughly in half to provide operating personnel for a war room. Eight additional enlisted men were pulled into the headquarters from elsewhere in the division. These men were draftsmen, clerks, and



Mobile Command Post for Infantry Division
Diagram 1

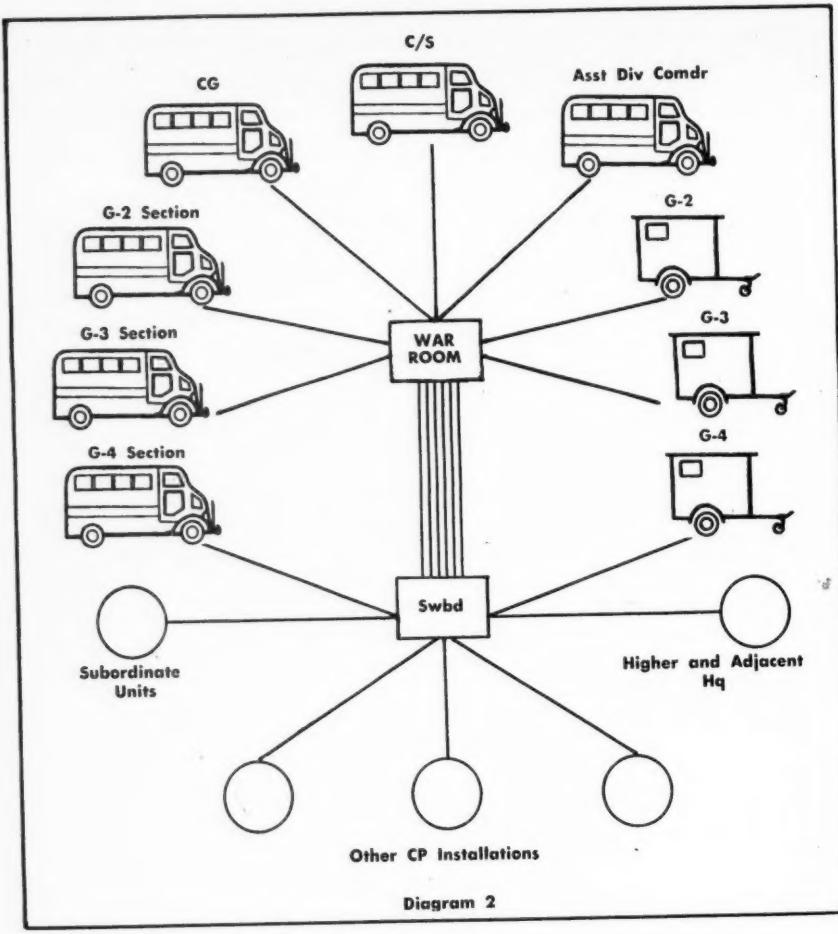


Diagram 2

stenographers, and were used to augment the war room operating detail to permit 24-hour functioning.

2. The signal company revised its wire system to provide special circuits into the war room, and circuits from a special monitoring switchboard in the war room itself to the CG, assistant div comdr, chief of staff, G-2 and G-3 sections, and the G-2 and G-3 individually. G-4 and G-4 section were connected with the main switchboard, because of the volume of their administrative calls.

The operation of the war room was made the responsibility of the chief of staff, who delegated this responsibility to the warrant officer secretary to the CG and the general staff. Each staff section main-

tained a situation map in the war room with G-1 coming forward daily to post his data on a G-1 board. The artillery and engineer liaison officers were on call in the war room, and maintained appropriate artillery maps, range charts, road maps, and bridge status diagrams.

A roster for duty officers from among the command post personnel was instituted to provide for a war room duty officer on a 24-hour basis. This officer was responsible for the posting of all maps, for briefing on the latest situation, for disseminating information to subordinate units, and for informing the CG and appropriate staff officers of important occurrences. He was also charged with supervision over the preparation of the unit journal—a function of the war room handled in this fashion:

1. One or more stenographers monitored the war room switchboard and recorded verbatim all incoming and outgoing conversations throughout the headquarters. These were typed and posted in the war room as an up-to-the-minute journal record of all telephone reports, orders, etc. To the journal were added all written orders and reports so that at the close of each 24-hour period the complete oral and written record of the day's activity was compiled in one place.

2. A toggle-switch on the switchboard enabled link-up between all intra-command circuits emanating from the war room. This feature allowed monitoring and recording of all intra-staff business when desired.

From the above we can picture a single room or tent which serves as the focal point for all command and staff functions. Radiating from this nerve center of the division are the individual wheeled installations of the CG and his staff.

The war room itself is the actual command post; other installations serve as agencies, work rooms, and even quarters.

The war room serves as the logical place

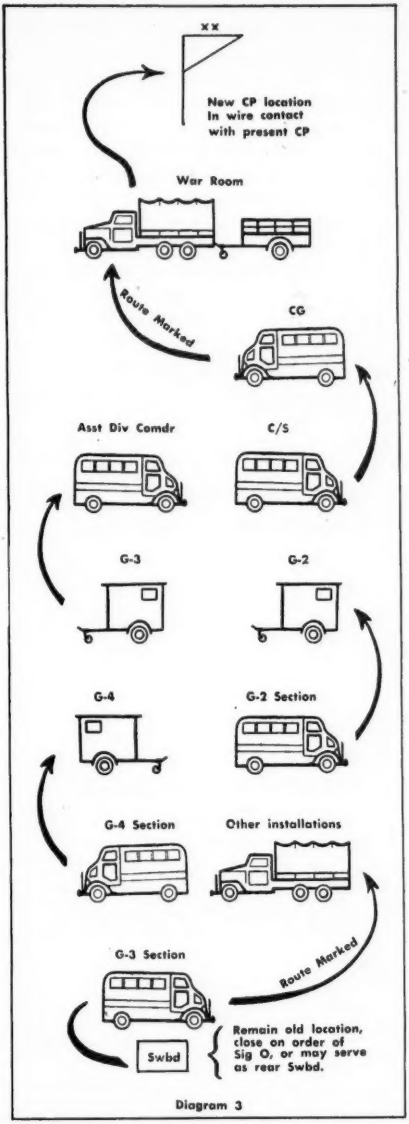


Diagram 3

for important commander and staff meetings, for briefings and orientations. It provides the answer for welding the staff sections together under the eye of the chief of staff. These advantages are convincing in themselves, but another must be highlighted. This is the divorcement of the war room itself from the operational functions of the staff sections, which functions are conducted in their respective office trailers, apart from the activities of the war room.

As a final consideration of this new organization, let us observe the manner in which our mobile, war-room-type command post displaces. We can assume that the new site has been selected, that communications have been installed and that the route has been marked. At this point the chief of staff announces that the command post will displace forward immediately by infiltration. Here is what happens:

1. The war room functions switch to the G-3 section trailer, van, or truck which has a situation map and communications. The chief of staff and assistant G-3 hold forth here until the command post opens at the new site, at which time they close out and move forward.

2. All other installations except the switchboard close out, pack up, load and move forward—everything is on wheels. The switchboard closes on order of the signal officer, but may remain in operation as a rear switching center.

This system eliminates shuttling and reduces to a minimum the time the command post will be inoperative due to the fact that the key installations are permanently installed in wheeled offices.

To conclude the inspection of this streamlined command post, refer to Diagrams 1, 2, and 3 for a summarization of the physical organization involved and the method of displacement.

One of the great shocks to the individual as he took his place in the battle was the necessity of adapting himself to living in the conditions of the battlefield, at the same time he was inuring himself to the enemy fire. If he understands well the requirements of personal hygiene and field sanitation, and in addition knows how to live in the heat, and dust; in dampness, cold, and mud; half the shock of the fighting is removed.

Lieutenant General Raymond S. McLain

Shipping in War

Colonel M. B. Stokes, Jr., *Transportation Corps*
Instructor, Command and General Staff College

THE strategic concept for the conduct of the war against the Axis powers is now more or less common knowledge. What is not so well known is the relationship between the concept and the transportation means—shipping—that was or became available to the United States.

In any future war which occurs before we reach the "push-button state," a transportation means, either ours or someone else's, will play a decisive role. Therefore, the story of how shipping influenced and implemented the strategy of World War II is not pure history for history's sake; it contains many lessons worth remembering.

Some of those lessons will be apparent as we trace the parallel development of the U.S. strategy and of the U.S. Merchant Marine in subsequent paragraphs, but they can be summarized briefly as follows:

1. *The initial stages of any war will be a race, with whatever transportation means are available, to get forces to critical spots.*

2. *Improvisations, such as converting available transportation means to do tasks for which they were not basically designed, will be resorted to.*

3. *The degree of success in meeting early demands will depend in large measure on the flexibility with which available transportation means are employed.*

4. *Since it is improbable that we will have on hand sufficient transportation means to carry through until the completion of operations, production planning must be closely coordinated with strategical planning.*

5. *Planners must visualize early that the movement in mass of personnel and supplies requires the provision in mass of transportation means.*

6. *Management or Control, to insure that transportation means are directed towards the main effort, will be essential.*

Early Problems—Troop Shipping

The first point where our shipping deficiency ran afoul of strategic desirability was in the matter of troop transport. During 1940 and 1941 the world situation called for a rapid reinforcement of our overseas bases. But only a few ships fitted to carry troops were available.

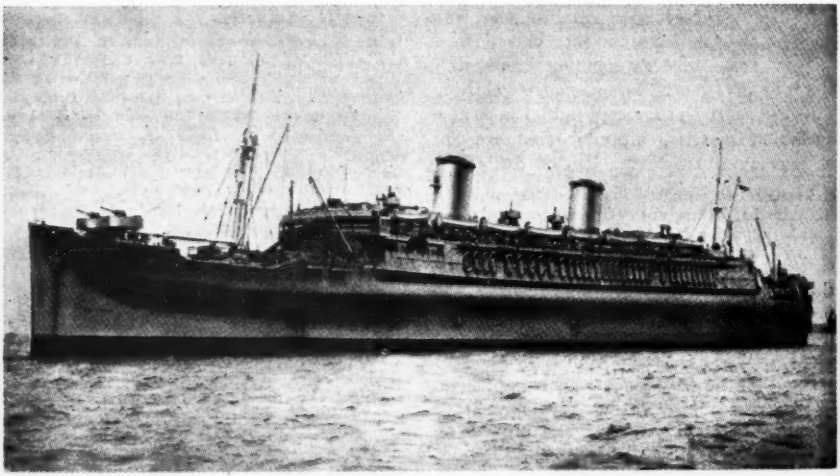
The outbreak of war in Europe found the Army operating eight transports out of New York and San Francisco, in service between those ports and to Puerto Rico, the Panama Canal, Alaska, Hawaii, and the Philippines. Of the small fleet, six were combination troop and freight ships, and two were freighters. During 1940 the Army added a number of passenger and cargo vessels to its fleet by purchase and charter. At the same time the Navy was building up its transport and supply fleet rapidly.

The requirements for moving troops, however, rapidly outstripped the piece-

meal acquisition of vessels by the Army and Navy. A much broader base was called for and we had to begin to think in terms of wholesale rather than retail lots. The small fleet of army transports was immediately available to meet emergency demands to the extent of its limited capacity, but it was not possible to put the military forces of the United States on a war basis until the shipping resources of the nation likewise were placed on a war basis.

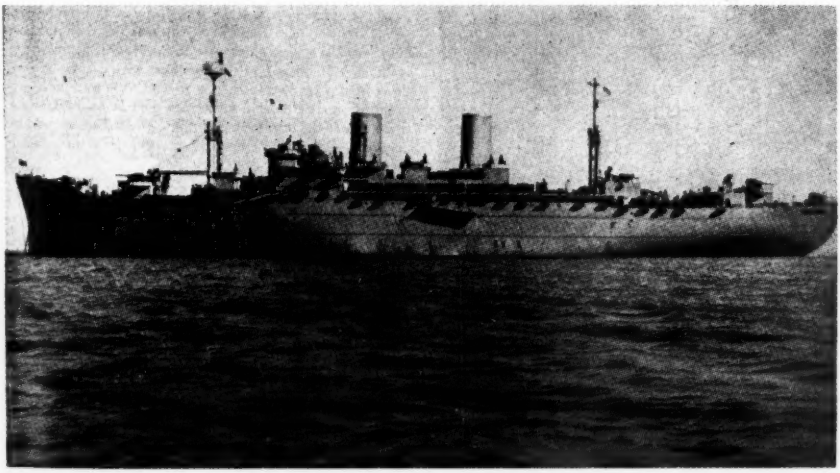
By late 1941, numerous erstwhile passenger liners had been converted to troop transports but these were spread thinly to meet requirements in the Atlantic, the Caribbean and the Pacific. The dispatch in late November and early December of 20,000 reinforcements to the Philippines required the utmost effort to collect eleven troopships to do the job. After Pearl Harbor, and when it became evident that additional troops must be sent to the Southwest Pacific to protect Australia, the movement of 25,000 troops for that purpose meant that every available ship would have to be employed. Thus, although the strategic concept called for the early assembly of adequate forces for a decisive blow in the European Theater, this movement to the Pacific severely restricted the build-up of our forces in the United Kingdom with the result that during the time the ships were in the Pacific—January to June 1942—only one division was moved to North Ireland.

These incidents seem minor when viewed in the light of later periods when hundreds of thousands of men were transported each month to all parts of the globe—but they were all-important at a time when our national existence seemed to depend on getting a few men first to this point and then to that point to stem the tide until we could get our feet under us. And you will note that the accomplishment of even these small missions depended upon the number of ships that could be assembled for the purpose.



The *Mariposa*—passenger liner converted to carry troops.

While the conversion of many passenger vessels had been started before the Japanese attack on Pearl Harbor, immediately after our entry into the war the entire fleet was surveyed and practically every U.S. merchant passenger ship was earmarked and scheduled for conversion to a troop transport or naval auxiliary. Some seventy-five vessels were involved, and they varied from small coastal or interisland types with a converted capacity of a few hundred up to the largest of American ships, the *America* (later the *West Point*) with a troop capacity of 8,500. In addition to these U.S. Flag vessels, several Axis ships were seized in U.S. ports, and twenty-odd Dutch, Norwegian, French and Chilean ships became available to swell the U.S. controlled pool.



Troop transport of the P-2 type, built during the war.

The conversion of these ships took time —from a few days for a hasty emergency conversion, to several months for a thorough job—but after one year of war our troop lift inventory had increased from its peacetime total of a few thousand to a capacity of 200,000. This capacity on an average two-months turn-around would move 100,000 troops per month. With those vessels as they gradually became available, plus help from the British, we transported a force of nearly 1,000,000 army personnel alone overseas in 1942. It was obvious, however, that unless the war was to be indefinitely prolonged, the full military strength of the United States would have to be placed within striking distance of the Axis citadels at the earliest possible date.

With this urgent need for additional troop shipping in mind, the Maritime Commission had started, in 1942, a substantial program that was to provide seventy-three modern transports during the next two and one-half years. These turned out to be splendid ships and their delivery to the troop ship pool, plus additional conversions, gradually increased our troop capacity from a lift of 200,000 at the beginning of 1943 to 600,000 by VE-day.

The Solution—Conversions

There were times, however, when the war could not wait for ships to slide from the building ways. The conversion processes, which had to be relied on at the very beginning to meet diversified military requirements, pointed the way to procedures that could be employed advantageously throughout the whole shipping structure. This principle had been highlighted in the Merchant Marine Act of 1936, and the wholesale application of it, with typical American ingenuity, gave a flexibility to the U.S. Merchant Marine that was to prove a decisive factor in meeting the numerous logistical problems resulting from modern war.

Let us look briefly at some of the more important problems that were solved by converting various types of ships to do jobs entirely different from those intended when the vessels were originally designed.

First, and foremost, was the one which had been touched on several times in the previous discussion—the conversion of passenger liners to troop transports. For well over a year this program provided us with practically our only source of troop lift. But soon we ran out of passenger liners to convert, and troop carriers were still in demand. Cargo vessels were the next source. A program for changing over 120 Liberties to troop transports during their construction was instituted. However, Liberties were slow and, therefore, not the best type for troopers, so

A liberty ship loading cargo.

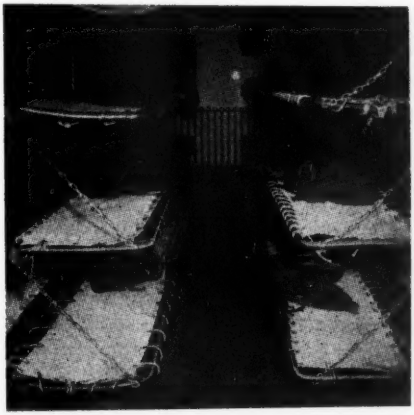
numerous other types were withdrawn from cargo service and converted to carry troops.

Although the Liberty ship was not looked on with favor by either the military or the Maritime Commission as a fully converted troop transport, that workhorse did perform yeoman service under a partial conversion. Its first use on a large scale in this capacity occurred during the Mediterranean campaign when General Eisenhower needed some way to evacuate to the U.S. several hundred thousand German and Italian prisoners of war. Liberty ships fitted with standee bunks that could be set up after vessels were unloaded and ready for their return voyage to the States proved the answer. Some 230 were fitted in this manner to carry an average of 350 prisoners of war. Later during the campaign, when more American troops were needed in the Mediterranean than troop transports could carry, these Liberties were pressed into service, and between June 1943 and May 1944 transported a total in excess of 200,000 badly needed reinforcements. It was tough going for the men who had to ride in them, but as an emergency measure their use was more than justified.

After hostilities ceased, these same Liberties were to fill another important role—the return of our forces for demobilization. In this case, however, more time was available to improve the accommodations provided, and 210 ships were given additional conversion to increase their capacity to 550 and to add to their facilities. Crossing the Atlantic in a Liberty still was not a picnic, but 376,000 American soldiers got home quicker by this means during the period from VE-day through 31 December.

Before leaving the Liberty—you can see what we mean by "flexibility!"—it should also be mentioned that six of them were converted to hospital ships and proudly assisted in returning many of our wounded veterans from overseas.

Next in line of importance, among the odd uses to which different types of vessels were put, was the conversion of tankers to transport assembled airplanes. During the war 47,851 aircraft were shipped by water to overseas destinations. This was

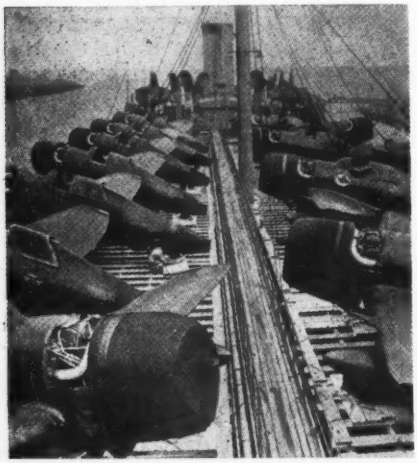


"Standee" bunks left little room.

about fifty-six per cent of the total number of aircraft sent to the theaters, the remainder having been flown. The technical problems and delays encountered by the theaters in putting together aircraft which had been dismantled and crated for shipment, emphasized the desirability of shipping as many as possible in assembled condition. The most noteworthy solution to this problem was the development of a program for the installation of false decks on tankers for the stowage of assembled planes. Altogether, about 500 American and British tankers were fitted in this manner, and they carried 16,517 assembled and 3,935 crated aircraft, as well as some vehicles. The transportation of so many aircraft in this manner released a large amount of space on regular cargo ships for other purposes, in addition to helping meet the demand for the delivery of assembled planes.

The Cargo Shipping Situation—Construction Versus Losses

In the earlier discussion, attention was drawn to the effect on our initial military effort of the shortage in troop transports. Soon it became apparent that cargo shipping also would become critical, because as our forces overseas were built up, more and more tonnage must be devoted to their maintenance, while at the same time lend-lease allocations were expanding, and our own rapidly developing war industries needed materials. At the beginning of 1942 the approximately 6,000,000 deadweight tons of active U.S. dry cargo vessels were distributed roughly as follows:



Assembled airplanes shipped on tankers.

Allocated to essential civilian needs 47%
Allocated to Lend-Lease ----------31%
Allocated to the Army and Navy --22%

With all commitments for shipping space growing by leaps and bounds, it was obvious that not only must the employment of our meager shipping resource be closely coordinated but also our construction programs would have to be carefully related to the logistic requirements of strategic undertakings in order to insure proper balance among the several types of ships that would be needed.

Coordinated planning thus became a keystone not only of our strategy but also of our shipbuilding effort.

The deployment and build-up of our forces overseas in accordance with strategic requirements could be forecast with reasonable accuracy, and the resulting requirements for logistical support shipping could be calculated, but these requirements could not be matched directly with the estimated delivery of new ships because of an unknown factor—losses.

The Axis powers, particularly Germany, were well aware of the utter dependence of the Allies upon shipping—not only for their defense, but also for any counter-offensive that might eventually materialize—and they did all they could to capitalize on this fact. Germany, from the early days of Hitler's regime, stressed the construction of submarines. The under-sea raider had almost accomplished its purpose in World War I; now there were improved types of U-boats available, air power was an added menace to shipping, and the Allies again were unprepared.

The German blockade became effective immediately, and during the twenty-seven months prior to the entry of the United States into the war, about 16,000,000 of the world's total of 80,000,000 deadweight tons (DWT) of shipping were sunk by the Axis. During the same period the combined output of the shipyards of the United Kingdom and the United States, which were almost the sole source of new merchant shipping for the Allies, was only 5,000,000 deadweight tons.

For the entire war period, the losses of vessels controlled by, or available to, the United Nations aggregated over 36,000,000 deadweight tons. Allied shipping losses during World War I were about 18,000,000 DWT. The total for World War II breaks down as follows:

	Non-Tanker DWT	*Tanker DWT*	*Total DWT*
Sept 1939-Dec 1941	13,700,000	2,600,000	16,300,000
Year 1942	8,957,000	3,070,000	12,027,000
Year 1943	4,342,000	977,000	5,319,000
Year 1944	1,804,000	293,000	2,097,000
Jan-Aug 1945	679,000	160,000	839,000
TOTAL	29,482,000	7,100,000	36,582,000

Of the above total, approximately 6,764,000 deadweight tons represented American ships lost.

The dilemma facing the planners in 1942 was: losses are now terrific, what will the loss rate be next year, and the year after? The loss rate forecast, balanced against new construction of ships would indicate the net shipping to be available to support the strategic undertakings. If forecasts of available shipping were too high, we might become committed to a strategy that could not be supported. On the other hand, if forecasts were too low, we might not be prepared to exert our maximum military efforts and thus the war would be prolonged.

In any event, it was obvious that the U.S. ship-building industry would be called on to produce to the limit of national capability—and that policy was followed with vigor.

Counting the small scale construction of 1941, we find that during the five-year period 1941-45, a total of 5,280 ocean-going vessels, aggregating over 54,000,000 deadweight tons was delivered. This total figure for American merchant ship deliveries breaks down into annual figures as follows:

Year	*No. of Ships*	*Deadweight Tons*
1941	105	1,165,200
1942	740	7,918,000
1943	1,719	18,561,400
1944	1,623	15,982,200
1945	1,093	10,597,300
TOTAL	5,280	54,224,100

The Invasion of North Africa

The first of the large scale strategical operations that were to call for all-out logistical support began in the fall of 1942 with the invasion of North Africa. This also was to be our first taste of the complex shipping problems that were to arise in connection with Combined British and American operations. Incidentally, it is interesting to note that shipping considerations played an important part in the initial decision to undertake an attack on North Africa. Such an attack was calculated to permit convoys to pass through the Mediterranean to the Middle East and India, instead of traveling the long route around South Africa, thus greatly reducing turn-around times. It would also help to check depredations on Allied shipping in the South Atlantic, and would cut off shipments of important products such as phosphate, manganese and foodstuffs to the Axis war machine.

During the spring and summer of 1942, in accordance with the strategic concept, our efforts had been concentrated on the build-up of forces in the United Kingdom in preparation for a combined assault across the Channel. When the decision was reached to postpone an assault on Europe in favor of the invasion of North Africa, original plans visualized that the forces would be mounted in the U.K. and would depend primarily on British shipping. As plans progressed, however, it became evident that British shipping would not be adequate, and that large scale U.S. assistance, both in troop and

cargo shipping, would be required, not only to carry troops and supplies from the U.S. to Africa, but also to support the forces originating in the U.K. This change in plans necessitated a rapid reorientation of U.S. shipping allocations and served to illustrate, at the very beginning, the need for flexibility in the handling of shipping—a characteristic that was to be demonstrated many times in later months.

One of the first of the revised demands on U.S. shipping involved the provision of combat loaders for the assault forces now scheduled to be mounted in the United States, twelve additional vessels of this type were needed and they could only be obtained by withdrawing ordinary transports from the U.K. build-up service and converting them hurriedly to fill the role of assault transports. This was accomplished by the Army and Navy, each converting six, but several were barely completed in time to load and sail with the initial convoy. The cargo shipping picture also was acute during this early period before our expanded ship-building program had reached its full stride, and records show that both the forces sailing from the U.K. and the U.S. initially were limited to fifty per cent of their organizational equipment. This shortage of equipment, especially motor vehicles, became increasingly serious as the campaign progressed and communication lines became longer, with the result that extraordinary measures had to be taken in February 1943 to ship 5,000 vehicles to North Africa.

The Continuous Struggle

For the next two and one-half years the deployment of U.S. forces in the Atlantic and in the Pacific, and the scope of the operations undertaken, were governed almost entirely by the shipping that could be made available for military purposes. Any increase in the scale of effort anywhere in the world had to be carefully analyzed to determine the shipping implications and the impact on other operations. If such an increase was considered essential, some other commitment against shipping was forced to accept a cut in its allocations.

This struggle to keep strategy and logistical support in balance continued right up to VE-day, when for the first time in the war, the full flood of shipping capacity could be directed towards a single objective—the all-out effort against Japan.

Shipping and the Final Effort Against Japan

Although the amphibious operations against the home islands of Japan proved to be unnecessary, by August 1945 shipping preparations were far advanced, and many of the required vessels had been allocated and loaded, and some were en route to assembly areas. Since these final operations were to be the climax of both our military and our shipping effort in World War II, it will be interesting to note just what they would have involved in terms of shipping.

First, by way of comparison, it will be recalled that the Normandy assault involved the sea transport of six divisions in the initial effort while, operation "Olympic" against Kyushu called for nine divisions in the initial force, and operation "Coronet" against Honshu, a few months later, involved fourteen divisions.

The distance from the U.K. to the Normandy beaches was some seventy miles and the supply line from the U.S. to Europe was 3,500 miles long. The primary base for "Olympic" was the Philippines—a distance of approximately 1,100 miles from the target area and 7,000 miles from the West Coast of the U.S.

No one can tell now what ultimate strength of forces would have been required had Japan persisted in a fanatical defense to the bitter end, but we can calculate from the shipping programs that were already set up, the tremendous ton-

nage that would have been necessary to *initiate* the operations.

A tabulation of shipping showing the several categories under which it was programmed probably will illustrate best the magnitude of the shipping effort required.

The shipping picture in the Pacific as of August 1945 was substantially as follows:

Dry Cargo Vessels

Shipping retained or otherwise available for local employment	319
Trans-Pacific shipping in Pacific areas	502
Shipping en route from the U.S.	255
Shipping en route from Europe	164
Shipping returning to U.S.	125
Shipping loading for the Pacific	85
TOTAL	1,450

The above total of dry cargo shipping approximates 14,500,000 deadweight tons, or more than twice the total cargo tonnage available to the American Merchant Marine at the start of the war!

In addition, 428,000 troop spaces, or about 184 troop transports, were serving the Pacific theaters, and well over 200 combat loaders, or large assault ships, were being groomed to load the amphibious divisions.

When we add the tankers that were being, or soon would be, required to supply petroleum products (estimated at some 421 tankers of 6,885,000 deadweight tons) we arrive at the staggering total of about 22,700,000 deadweight tons of shipping, exclusive of landing craft and Naval combatant vessels, devoted solely to the support of military operations against Japan.

Management on a World-Wide Scale

No picture of the employment of shipping in World War II would be complete without an understanding of the control machinery used to direct this transportation means which played such a vital part in our world-wide military activities.

Early in 1942, the War Shipping Administration (WSA) was formed to take over from the Maritime Commission the management and operating phases of the employment of the U.S. Merchant Marine, and in February, the Combined Chiefs of Staff formed the Combined Military Transportation Committee, the general mission of which was to coordinate the combined employment of the U.S. and British controlled pools of merchant vessels for the furtherance of our combined military effort. On this committee was represented the U.S. Army and Navy, the British Army and Navy, the War Shipping Administration and the British Ministry of War Transport. This committee functioned throughout the war and filled an important role in coordinating the overall employment of the shipping resources of the United Nations.

Of more immediate interest to us, however was the Joint Military Transportation Committee (JMTC) which was formed concurrently with the combined organization and which provided a U.S. joint agency consisting of Army, Navy and War Shipping Administration and/or Maritime Commission representation to coordinate the employment of U.S. shipping, and to insure that future requirements and future construction programs were closely tied together.

It was through this Committee that the Maritime Commission learned the forecasts of shipping quantities and types that would be needed to support the strategic operations planned by the Joint Chiefs of Staff. Similarly, the Committee followed closely the progress of Maritime Commission building programs and translated forecast deliveries of vessels into terms of shipping capabilities to support planned operations.

Since a description of the activities of the Joint Military Transportation Committee is in reality a description of how joint overseas transportation problems were handled throughout the war, a brief discussion of the manner in which that Committee carried out its functions is in order. Its work covered the whole field of shipping in its relationship to the war effort of the United States, but the tasks can be grouped under three general headings:

(1) *Allocation of Shipping Problems.*—Representatives of the Office, Chief of Transportation and of the Naval Transportation Service formed the working subcommittee of the JMTC. These two groups formulated the estimates of shipping requirements for their respective services.

In the normal course of business, the working subcommittee combined the requirements of each service and presented them informally to the WSA. On occasions when long-range strategic planning was involved, the forecasts of military shipping requirements were included in formal studies.

The War Shipping Administration represented all non-military claimants for U.S. shipping, and it tabulated estimates of such requirements. At least once each month the military and non-military demands were combined by WSA and Army and Navy representatives. The WSA then determined the overall shipping position for the next several months by comparing sailings per month required to the estimated number of ships to be available for loading each month.

This overall position, which usually showed deficits, was presented either formally or informally to the JMTC. The JMTC then allotted a proportionate share of available vessels to each claimant. If the deficits were so large as to endanger military operations, the Joint Chiefs of Staff and, less frequently, the President were asked to indicate priorities.

With decision made as to the allotment of shipping, the WSA allocated vessels to implement the decisions of the JMTC or higher authority.

(2) *Ship Construction or Conversion.*—Matters of ship construction or conversion requirements were either initiated by individual members of the JMTC or came down from higher authority as a result of strategic studies or conditions developing in the field of critical materials.

The study of these problems required joint action by the JMTC and the Joint Logistics Committee. A subcommittee was formed from among representatives of each parent committee to develop the facts, draw conclusions and make recommendations for submission to the Joint Chiefs of Staff.

(3) *Miscellaneous Problems.*—Most of the other problems continually before the JMTC related either directly or indirectly to the two general classes discussed above. For example when major operations were being planned by the Joint Staff Planners, representatives of the JMTC collaborated in the development of such plans by subcommittee work. This work covered two main fields: first, equating the elements of the proposed plan into shipping requirements and second, determining, in the light of other known commitments, whether or not the proposed plan could be supported by available shipping. Thus, the JMTC was intimately concerned with all phases of strategic planning with the result that when plans for overseas operations were presented to the Chiefs of Staff, the vital question of shipping availability already had been thoroughly investigated.

Similarly, plans originating in overseas theaters were studied by representatives of the JMTC to determine shipping implications.

This close relationship between the JMTC and the Strategic Planners insured that military operations were closely coordinated with shipping resources.

Conclusions

Attention is again invited to the lessons enumerated in the first part of this article. A wise government has decreed that an adequate number of ships be maintained in a reserve fleet so that this country will not again have to start from scratch to create a surface transportation means. But as time goes on and new developments introduce new transportation problems, it is not beyond the realm of possibility that we will be faced in any future war with problems very similar to those encountered in World War II, regardless of the transportation means in vogue at that future date.

It had always been the concept of the United States Chiefs of Staff that Japan could best be defeated by a series of amphibious attacks across the far reaches of the Pacific. Oceans are formidable barriers, but for the nation enjoying naval superiority they become highroads of invasion.

Japan's attack on our fleet at Pearl Harbor gave her a tremendous but, nevertheless, temporary advantage. The Japanese had reckoned without the shipyards of America and the fighting tradition of the United States Navy. Even before parity with the Japanese fleet had been regained, the Navy successfully maintained communications with Australia and had undertaken limited offensive in the Solomons to halt the enemy advance. A desperate courage stopped the Japanese before Australia in the now historic battle of the Coral Sea and then shortly afterward utterly smashed the Japanese advance toward the United States itself in the decisive action at Midway.

General of the Army George C. Marshall

The Need *for* Economic Intelligence

Lieutenant Colonel C. T. Schmidt, *Infantry*
Instructor, Command and General Staff College

IN the late spring of 1944, the Allied strategic air forces began an all-out campaign against the synthetic-oil plants of Germany. During the summer and autumn of that year, the heavy bombers again and again attacked the plants in central Germany, in Silesia and in the Ruhr, drawing ever tighter a critical bottleneck of German war production. The result was an almost complete breakdown of Germany's ability to supply her military machine with oil and gasoline. By September 1944 the output of aviation gasoline was only five per cent of what it had been in March. Without fuel, much of the German air force was grounded. Throughout this fateful period the Allied air forces were supreme over Western Europe and Germany. Certainly, one of the major factors in Germany's collapse was the destruction of much of her liquid fuel output by American and British air power.

This campaign—like the air campaigns against other German industries—was aimed at the enemy's ability to produce goods essential to his war effort. That is, it was *economic warfare*. It was based upon a knowledge of the importance of synthetic oil production for the enemy's military operations, upon a knowledge of the location, size, layout, and other characteristics of the producing plants. That is, it was based on *economic intelligence*.

Economic Warfare

A little stirring of our memories will give us many other instances of recent military operations whose object was to deny the enemy an important foreign raw material or manufactured commodity, or to weaken the enemy's ability to produce or transport goods essential in war. There is the German seizure of Denmark and its supplies of butter, bacon, and eggs, and of Rumania and its oil fields. That hurt the British, and helped the Germans. There is the Japanese conquest of Malaya and the East Indies, with their riches in tin, rubber, and oil. There is the Allied air and naval campaign against vital links in the Japanese industrial and transportation systems. All these operations were successful, and they were supported by good intelligence. We can also think of economic warfare that failed, either because it was based on bad intelligence, or because it could not be completely carried out. Here we can point to the German submarine campaign against the North Atlantic shipping routes, and to Germany's attempt to seize the bulk of Russia's industrial resources in one swift campaign.

Of course, economic warfare is old, as old as war itself. We can find many instances of it in World War I, in the American Civil and Revolutionary Wars, in the Napoleonic Wars. *But a full-fledged conscious integration of military and economic plans and operations* is comparatively recent.

Growing Emphasis on Economic Intelligence

When war broke out in 1914, the governments of the warring powers, their general staffs, and their peoples were convinced that the conflict would be ended within a few months. If it should happen that more soldiers were needed, additional classes would be called to the colors. Little thought was given to the effects of conscription upon essential industrial manpower. If more military supplies were required, they would be ordered from manufacturers in hand-to-mouth fashion. Meanwhile, business would go on "as usual." Little thought was given to the enormous and far reaching impact of modern war upon a nation's economic system. Only through bitter experience did the belligerents learn the necessity for a deliberate control, in the primary interest of victory, over their industrial organization—for governmental regulation of production, employment, investments, prices and consumption, so as best to meet the needs of war. At the same time, it came to be realized that a main element in victory is a weakening of the *enemy's* ability to feed, clothe, and equip himself. And this could not be done unless there were accurate knowledge of the enemy's economic situation.

Over a hundred years ago Clausewitz said that war is but a continuation of politics by other means. Only in our times, however, do we comprehend fully the complex and all-embracing nature of these "other means." Modern technology has made war a conflict of machines, materials, and skills of all kinds. These things are enmeshed in a tightly integrated industrial system; they are an expression of a fine adjustment of labor, management, investments, and prices. To use them effectively in war, and with the speed that war demands, it is necessary to guide and control the industrial system toward the goal of victory.

It is now understood that war requires an organization *for war purposes* of all resources of a nation. A corollary is that a major factor in the defeat of the enemy is a destruction of his industrial system. A reflection of this is the increased emphasis put upon economic matters in judging the strengths and weaknesses of enemies and potential enemies. During World War II not only did the intelligence staffs of the high commands and theater commanders include economic specialists, but whole departments of government, such as the British Ministry of Economic Warfare and our own Board of Economic Warfare were concerned with economic intelligence and economic warfare.

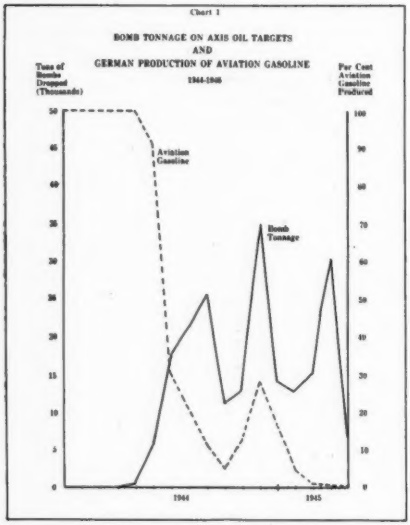
Furthermore, the development of economic intelligence, like that of all strategic intelligence is a *continuing* process. It must be carried on at all times. Both in war and in peace a knowledge of the industrial capabilities of other countries is crucial in determining their potential for war and their intentions toward the rest of the world. It has thus a prime significance in the shaping of our own strategic plans and actions. Moreover, the possibility of a sudden and widespread destruction of key points in the interior of a country, by means of the newest weapons of war, makes a study of economic strengths and weaknesses of increased importance to those who are charged with the security of a nation.

Measuring a Nation's Power

As the world is constituted today, the final measure of a people's power is made in the crucible of war. Short of that extreme, however, it is possible to assess the factors that determine national capabilities. These factors include the topography of the nation, its military establishment, its political leadership and government, its scientific resources, and, not least, its industrial manpower, material resources and economic organization.

The quantity and quality of a nation's

labor force, of its industrial raw materials and facilities for production, are obvious elements of economic strength. So, too, is its accumulation of technical knowledge, industrial skills and "know-how." Finally the organization of its human and material resources—the way in which management, labor, capital, and land are applied to the productive process—is of great significance. The largest human and material



resources alone do not provide strength. A nation's ability to organize its resources for efficient production, and to adapt its economic organization quickly to war conditions is vital.

Nature of Economic Intelligence

Here, then, is the special interest of strategic intelligence in industrial, or economic, matters. Simply stated, economic intelligence is accurate information on foreign industrial systems, particularly on their ability to produce the goods required in total war. More formally, economic intelligence may be defined as information, properly evaluated and interpreted, on the economic activities of foreign powers which contribute to their war potential and influence their intentions, whether peaceful or belligerent. Although the production of economic intelligence is likely to be laborious and specialized, there is nothing mysterious about it.

Objectives of Economic Intelligence

What are the objectives of economic intelligence? What is its military significance?

Basically, economic intelligence throws light on the war-making capabilities of the nations, on their potential output of the materials of war. In large degree, the ability of a nation to make war lies in its capacity, under stress and over an extended period, to produce the physical weapons—the guns and ammunition, the tanks, planes, and ships—as well as the myriad of other goods needed to support its military and industrial forces. Therefore, the economic intelligence specialist must evaluate the natural resources of a nation, its degree of dependence upon other countries for materials, its industrial output, its ability to re-direct and expand industrial production for the special purposes of war.

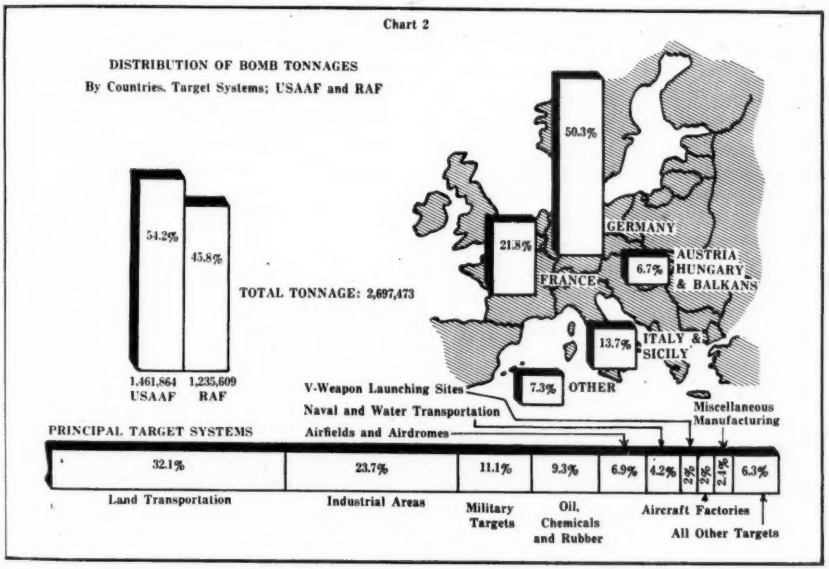
Furthermore, economic intelligence can be of great assistance in determining the warlike intentions of a nation. War demands a mobilization in the industrial field as well as in the military. Economic preparations, like the stockpiling of essential raw materials or the development of high-cost synthetic substitutes, may reflect an acceptance of eventual war by a nation's leaders as surely as would a stepping up of outright military preparations. It has been noted that modern war calls for a special organization of industry, a control of economic affairs for the ends of war. Such control includes the direction of labor and materials toward particular in-

dustries, and the curtailment of non-essential civilian production. Adoption of these measures of a war economy may also be a significant clue to a nation's intentions.

Certain countries even operate more or less continually under the regime of a war economy. Employment, production, management, prices, wages, and the distribution of goods are governed by state decisions. Government officials are experienced in this kind of administration, and the people are accustomed to a large degree of governmental direction of industrial affairs. Such a country may or may not be developing its economic system primarily with a view to war. In any case, its economy can be shifted, without major reorganization, to a full war basis. It can quickly apply its industrial potential to the needs of war and, therefore, has an initial advantage over its industrially unmobilized adversary. A military high command must give serious consideration to such a factor in its estimate of national capabilities.

Finally, economic intelligence provides knowledge essential to economic warfare; that is, to measures intended to harm the enemy's industrial apparatus, both by denying him the strategic materials he must get from abroad and by destroying his war industries. For this purpose, a knowledge of strong and weak points of national economies is needed. The economic intelligence specialist provides the operational planners with accurate information on the location and character of steel plants, freight yards, oil refineries, power stations, chemical plants, and other industrial installations. Moreover, his study of a specific country will tell him where the bottlenecks of its industry are, and to what degree its military effort would be hampered by loss of special materials or fa-

Chart 2



cilities. Thus, economic intelligence answers the questions: What industrial targets shall we attack? Where are they? In what priority shall we strike them?

Most of this information must be gathered and analyzed in peace-time. It must be on hand and available for operational purposes as soon as war comes. Furthermore, it will be much more difficult to obtain after hostilities begin.

During the course of war the effects of attacks upon the enemy's economy must be studied. What, for example, are the results of air bombardment of a specific industry? Should attacks be continued against the target, or should they be shifted to others? Where, in terms of our current strategy, should we direct maximum pressure against the enemy's industrial ability to support his armed forces?

Conclusion

Thus, because the strategic capabilities and intentions of all nations are so largely conditioned by industrial matters, economic intelligence is of great importance to all who are responsible for a country's security. And economic intelligence has a direct military significance. By throwing light on a potential enemy's industrial capacities and preparations for war, it assists a high command in preparing plans for mobilization and military operations. Finally, it provides information essential to the planning and execution of economic warfare, whose conduct is largely a responsibility of the armed forces.

Orderly civil administration must be maintained in support of military operations in liberated and occupied territories. In previous wars, the United States had no prepared plan for this purpose. In this war it was necessary to mobilize the full resources of both liberated and occupied countries to aid in defeating the enemy. The security of lines of communication and channels of supply, the prevention of sabotage, the control of epidemics, the restoration of production in order to decrease import needs, the maintenance of good order in general, all were factors involved. It was important to transform the inhabitants of liberated countries into fighting allies.

General of the Army George C. Marshall

The Specialized Armor Development Establishment *in Great Britain*

Colonel Harry W. Sweeting, *Infantry*

"THAT equipment is no damn good—it breaks down every time they try to put it in action." With those words many a piece of specialized armor equipment has been more or less justly condemned—and many a principle of real merit has suffered delayed development because of the failure of its first faulty mechanical expression. Sometimes the device itself was of reasonable mechanical reliability but the technique with which it was employed produced unconvincing results. However, special armor of various types served so well on many occasions that its value in general is no longer a matter of question. Research and development of special armor and the technique of its employment must continue in peacetime. In order to do this, the British have organized the Specialized Armor Development Establishment (SADE).

Before plunging into a description of the mission and functions of SADE it might be well to review more completely some of the considerations that justify such an organization.

The recent war saw the birth and development of many new weapons—some of which have already effected changes in the conception of strategy, tactics, and technique that may be applied in some future conflict. No sooner are weapons conceived than it is found that new tactics are required to utilize them effectively. The cycle seems endless and there could be danger of floundering around hopelessly for a best solution if the objective in the development of new equipment is not coordinated with some selected premise as to the probable nature of the *next* war.

Some people may consider it a faulty and dangerous policy to attempt to outguess future developments and establish equipment design objectives thereon. Yet this is the only way to maintain a continuing gradual development of equipment to match the meanderings of the fluid theories of warfare. All armored equipment, however, is so interrelated that a major change in the basic normal tank may effect a score or more related vehicles, devices and equipment—not only in armor itself, but in other arms including the Air Forces. If we do not establish a system of development by increments, so to speak, our equipment will always be in a hopelessly new stage of development without adequate collateral development of supporting devices. If such is the state of affairs at the start of a war we may never get to use the super-modern equipment we have under development at the time.

We see that the designers of armored equipment, both ordinary and special purpose, have an interesting problem. If the next war is to move swiftly to a climax—and some say that it will—then the armor that is in production at the initiation of the conflict may well be the armor in use at the conclusion. Then the using arms

must see to it that the peacetime development of armor conforms to the conception of its probable use. Coordination between the using arms and the designer is more important than ever—especially when we are not content with a simple tank that can merely produce a little armored fire power. We try to make the tank swim—and do—give it flame guns; attach bull dozer blades, rockets, flails, searchlights—just to name a few of the "gadgets."

Some of these devices had proved themselves on the battlefield—but how often have personnel in combat experienced at one time or another the difficulties of last minute imposition of otherwise highly desirable armored equipment just prior to an operation? At times the user has been so doubtful of the capability of the equipment to do the job, and has been so inexperienced in its employment that the value and sometimes even the use of the equipment has been lost or neglected.

Special equipment was developed so fast that the soldier in the field could not keep up with its best use—the secret nature of some new devices seriously restricting general knowledge of both the equipment and its employment. But even if the soldier in the field could be trained in the mechanical operation of each new device it is doubtful that the necessary understanding and confidence in the gadget could be developed to a degree sufficient to insure its best use. (Combat soldiers are skeptical of gadgets unless they work the first time with impressive results.) We may start and finish the "next" war with the same

TOPEE: Armor plate protection for Folding Flotation when the screen is in the lowered position. An early type now obsolescent.

basic hull design, but it is almost certain that much special equipment will be introduced during the course of combat, and it would seem wise to be prepared to use this equipment to the best advantage and take such special measures now as are necessary to insure that we will have trained personnel and developed technique to do so.

Another TOPEE: Armor plate protection for Folding Flotation when the screen is in the lowered position. An early type now obsolescent.

The British Plan

With the realization that they were not getting the most from what special equipment they had already developed, the British, in April 1943, consolidated under the Headquarters of the 79th Armored Division all their specialized armor in brigades, according to types of equipment. Thus they centralized responsibility for development and provided expert advice on technique of employment. From later combat experience they drew the conclusion that centralized control was as essential in combat as it was in the preparatory stages for the following reasons:

a) The necessity for a controlled plan of maintenance, rest and relief to prevent unjustified exhaustion of specialized units by individual commanders, to an extent which rendered them inoperative at later and more important stages of the battle.

b) The necessity for coordinated planning in accordance with the future intentions of the higher commander to insure

most effective grouping of specialized units and their supporting services.

c) The necessity for flexibility in assault teams so that the best combination of arms could be provided for any given operation.

d) The necessity for providing commanders at each level with a single responsible officer qualified both to advise and control a team of all specialized armor allotted to the action.

SHERMAN DUPLEX: An early type of Tank Searchlight now obsolete.

The subsequent successful operations of the units of the 79th Armored Division emphasized the importance of continuing, during peacetime, both the development of special armored equipment and the training of personnel in its use. So, in October 1945, the British organized SADE with Headquarters at Brandeston Hall near Woodbridge, Suffolk, England. Major General Sir Percy C. S. Hobart undertook this task with equipment and battle-experienced personnel of the 79th Armored Division augmented by selected technical personnel.

The task was not easy. The problems of a new organization, the difficulties caused by demobilization, the necessity to

produce quickly sufficient workable ideas to justify the existence of the establishment—were full-time tasks that initially required first priority attention. Refinements in organization and assignment of responsibility had to be worked out gradually as experience indicated.

In April 1946, Brigadier Alan W. Brown assumed command of SADE, and at a conference, 25 April to 1 May, effected a general clarification of organization, reassignment of tasks to sub-units and definition of mission.

EXPERIMENTAL EXTERNAL SEARCHLIGHTS: Mercury Vapor Beach Lights mounted on a Cromwell for test.

Before enumerating the objectives in the development of equipment, a guiding tactical conception was expounded which reflects the line of thought at SADE, but is not officially concerned with the views of the War Office or any other official source. Several interesting considerations were set forth which stand out for their effect on the selection of a set of "tasks in general" for SADE. These are:

a. An aggressor may use the reluctance of another power to use atomic power first, as a lever to extort territorial concessions by the use of normal ground forces.

b. An aggressor may be reluctant to use atomic power for fear of retaliation in kind.

c. The day of ground forces is not necessarily over; especially when it is noted that in the past an aggressor has preferred to gain his ends by means of mobility rather than destruction, and has only used destructive means when his attempts at gaining a decision by mobility have failed.

d. The best answer known at present, to the atom bomb and V-2 rocket is to occupy the launching sites and the factories where they are made.

c. The use of either atom bombs or V-2 rockets will certainly preclude the feasibility of large concentrations of troops and equipment and will force an expeditionary force to deploy and move swiftly towards its objectives, *avoiding defiles*—or face almost certain defeat.

The above considerations were in mind when SADE drew up the following "tasks in general" which comprise an outline of SADE's mission:

1. To conduct user trials and development of Armored Combat Vehicles and specialized equipment with the object of increasing the effectiveness of armored forces under likely conditions of future warfare by:

a. Improving mobility.

b. Providing or suggesting solutions to the problems inherent in the increased dispersion required by probable future conditions.

c. Improving fire power.

d. Improving endurance.

2. Drafting or commenting on specifications for Armored Fighting Vehicles and specialized equipment as required by the War Office.

3. Liaison with Fighting Vehicle Design Department in connection with specifications and design of armored fighting vehicles and specialized equipment, and representation of user views through the War Office.

4. Liaison over a wide field with a view to bringing to the notice of the War Office and developments by other establishments, services, scientists, civilian firms, etc., which might have an application to armored warfare.

5. Such production, development and trial, with War Office approval, of mock-up equipment to prove the feasibility of unorthodox ideas.

6. The maintenance of a trained nucleus for the headquarters of a formation of specialized armor.

7. Minor tactical research in connection with the equipment concerned, including the evolution of new techniques and drills where required.

8. The maintenance of a nucleus of personnel highly trained in operating each item of the equipment concerned.

9. The maintenance, so far as resources permit, of instructors capable of converting unit or school personnel to the equipment concerned.

In order to accomplish these tasks SADE is organized into a Headquarters and four Wings as follows:

The Wings as illustrated are assigned general functions as follows:

'A' Wing—Trial and development of normal armored vehicles.

'B' Wing—Trial and development of equipment which is likely to remain specialized, e.g. flails, scissors bridges, etc.

'C' Wing—Trial and development of amphibious equipment.

'D' Wing—Support the other Wings by production and modification of design ideas created in the testing Wings.

About twenty-five per cent of the officer and enlisted personnel of SADE are Royal Electrical Mechanical Engineers (REME) with extensive combat experience. The bulk of the remainder are combat-experienced men of the Royal Armored Corps.

The General Staff Branch is composed of three sections:

a. Operations and Training.

b. Technical.

c. Intelligence.

Their activities are coordinated by the Chief of Staff, who also implements the details of the General Policy laid down by the Commander.

The Operations and Training section considers the operational use of equipment under trial and development, prepares tactical and training notes for the operational use of equipment developed, and

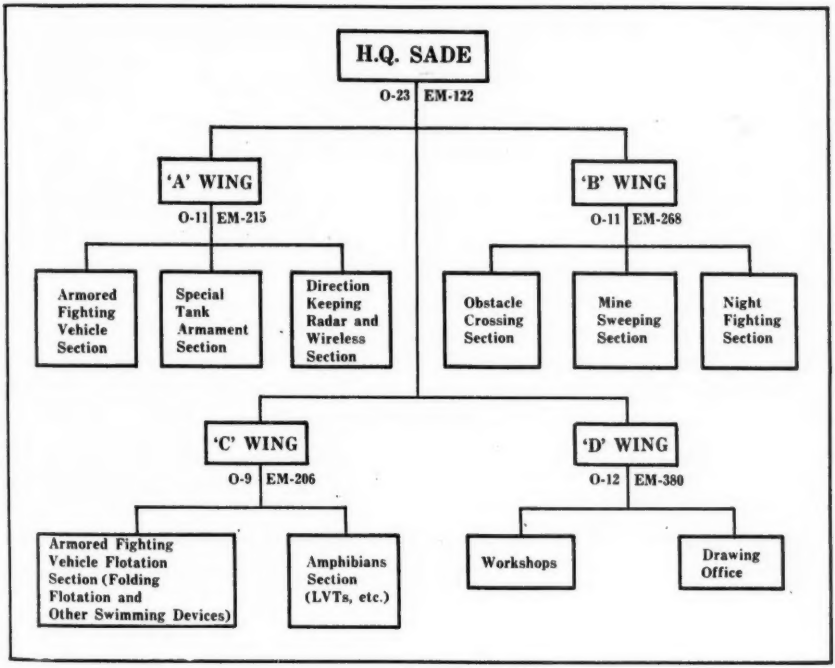
coordinates the general military training of all personnel in the establishment.

The Technical section plans the technical research and development programs, deals with all technical details of the work undertaken, and compiles technical reports and data.

The Intelligence section maintains liaison with the War Office, other technical establishments under the direction of the War Office, other Service Ministries, and Ministry of Supply; and, where necessary, civilian firms. This section also keeps intelligence files and data for study and use in connection with development of experiments.

A Deputy Director, Mechanical Engineering (DDME) directs activities of all REME personnel, acts as personal technical advisor to the Commander, and maintains close liaison with the War Office and Ministry of Supply.

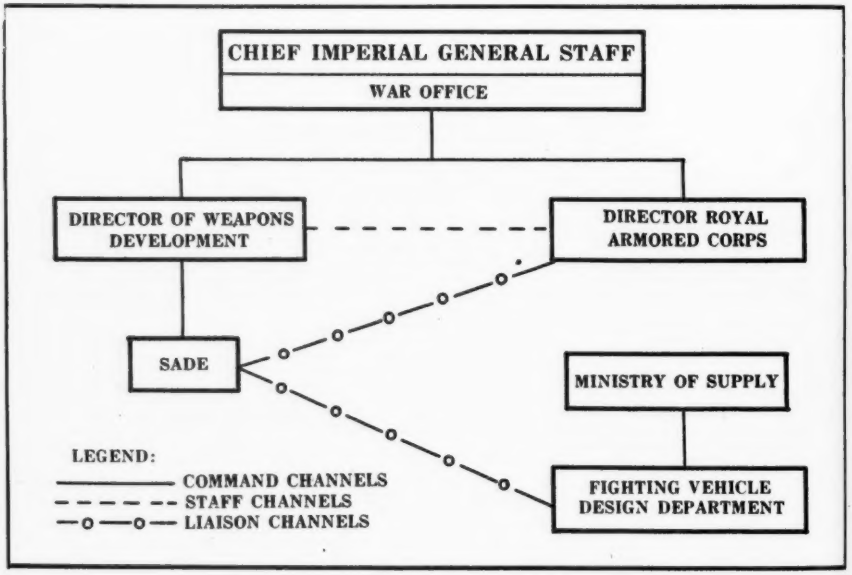
In a general staff organization of this size, the DDME and Technical sections might well be combined under one special staff officer (Ord) but the British have divorced the staff planning section from the operational section (DDME) to insure the latter has ample time for work in the field.



The chart (page 48) illustrates the relation of SADE to the War Office, the Royal Armored Corps and the Ministry of Supply.

SADE operates directly under Director of Weapons Development (DWD) War Office, for all matters of policy and coordination but deals directly with Director

of Royal Armored Corps (DRAC) and other War Office directors on matters of detail. Direct liaison is maintained between SADE, DRAC and the Fighting Vehicle Design Department of the Ministry of Supply. The Ministry of Supply is a civilian government organization responsible for the design, production and procurement of war supplies and has no direct counterpart in the U.S. Army or Government.



The DWD, DRAC, or other War Office Directorate concerned furnishes SADE with draft specifications of new or improved armored and related equipment and SADE recommends changes as experience, study and test indicate. After further modifications or approval at the War Office the specifications are handed over to the Ministry of Supply. Here, SADE liaison officers follow its development and keep the War Office informed of the progress and of recommended changes to be incorporated from the earliest stages of design. Upon completion, a prototype is sent to SADE for test; SADE being one of the "user" organizations assisting in the test of prototypes.

The technical and mechanical equipment, plus the technical qualifications of personnel assigned to SADE, is intended to enable the establishment to undertake basic development of new ideas to the point where a practical demonstration can be accomplished. By this means it is hoped to introduce field tested ideas to the original design of combat vehicles and to eliminate undesirable design from new equipment while it is still in the drawing board stage. SADE does not attempt to finalize design but does attempt to select and coordinate the application of new devices by actual physical trials.

Technical and tactical drills are developed by various wings as they test and

demonstrate the equipment. No radical changes have been made in the technique developed for equipment employed in the recent war, but further development of that same equipment has been continued as a logical interim measure until better devices can be conceived and produced. In this respect it would undoubtedly be afforded by a complete tactical organization, the unit itself would be a source of many practical ideas born in the field under the stimulus of actual field maneuvers—in which the technicians could eat, sleep and live with the combat soldiers and their problems.

At present, approximately ninety-five

FLAIL TANK: A development type rotor ready for test. Rotors of similar type have been very promising.

a great advantage if a complete combat outfit such as a tank battalion were attached directly to SADE. Such an outfit, training in the field, would keep alive the problems of movement, reorganization, control, etc., much better than cooling memories of combat, even though the assembled combat experience at SADE is of unquestionable value as it is applied at present. In addition to improved application and test of technique and drills projects are under study or development at SADE. Of this number about forty involve actual physical development, while the rest are technical and tactical studies intended to provide for the collection and correlation of information on the subjects concerned to enable the Command and Staff at SADE to render considered opinions when called for.

Many of the projects at SADE are so classified to preclude mention in this ar-

ticle, but the trend of the work can be indicated by mentioning a few familiar devices that are still undergoing trial and development: The Flail for detonation of AT mines; Jet mine clearing; Tank Searchlights—for aimed tank fire at night; guns—their use and positioning on vehicles; Study and recommendations for new types of armored fighting vehicles; Tank ventilation, stowage, vision devices, armaments, etc.; Lane marking; and other devices both established and new.

FLAIL ROTOR: A development type rotor after test in which it exploded fifteen single, fifteen double and ten triple Teller mines before it became inoperable.

Snakes and parallel charges; Folding Flotation to swim a normal tank; Radio direction keeping; Radar application; Radio remote control; Radio navigational aids; Station keeping for land and amphibious operations; Study of current armored fighting vehicles, including foreign makes; Infra-red application; Flame

In addition to carrying on work on projects, SADE has been engaged in assisting in the training of Royal Tank Regiments in the employment of Special Armored Equipment. Manuals on technique and drill for special equipment are being drafted at this writing.

The Command and Staff at SADE are

not afraid of a new idea and will consider and physically try any idea from any source if it shows the least bit of promise. Their attitude is that if they discover one good idea in a hundred, they are operating on a paying basis. So far, it appears that their average is much better than that and it is almost certain that this new establishment will more than justify its existence.

Overshadowing all other technological advance of the war was the Allied development of the atomic explosive. The tremendous military advantage of this terrifying weapon fell to us through a combination of good luck, good management and prodigious effort. The harnessing of atomic power should give Americans confidence in their destiny but at the same time we must be extremely careful not to fall victim to overconfidence. This tremendous discovery will not be ours exclusively indefinitely. In the years of peace between the two world wars we permitted Germany to far outpace us in the development of instruments which might have military use. As a consequence German development of long-range rockets and pilotless aircraft, stemming from years of peacetime research, was far more advanced than our own, which began in earnest only after the war had already started. The fact that we overtook Germany's head start on the atomic explosive is conforting, but certainly should not lull us again into a state of complacent inertia.

General of the Army George C. Marshall

Convoy Organization *in* World War II

Rear Admiral M. R. Browning, *United States Navy* (Retired)

OF the millions of officers and men of the U.S. Army and the Army Air Forces who were transported overseas in United Nations convoys during the period between Pearl Harbor and VJ-day, it is probably safe to say that not one in a thousand had any real acquaintance with the tremendous and far-reaching organization of the system whose functioning made their safe passage possible. It is the purpose of this article to outline, briefly, some of the more important features of that organization, and of the crucial problems which had to be mastered in building it, in the hope that by so doing, a higher percentage of the personnel who may have to travel in convoy in the future may thus gain an insight into its workings. With the approaching advent of factual merger of our Armed Services, the acquiring of such an insight by Army and Air Force personnel into what has hitherto been considered strictly a Navy activity has ceased to be merely desirable and has become imperative.

Convoy in this modern age is fundamentally a wartime activity. It is true that there have been convoy operations in the past when formal belligerency was not an attendant factor and there will, no doubt, be future repetitions of such operations; but these have been occasioned either by the fear of pirate attack—an activity which constitutes, in fact, war in a limited form—or by the menace of storm or other natural hazard of the sea involving possible loss of the shipping employed. Today, convoy under these circumstances is minor in scope and sporadic in occurrence. Such convoy operations are not included within the purview of this discussion.

The basic premise that convoy is fundamentally a wartime activity may properly be further narrowed by the additional qualification that it is essentially defensive in its tactical nature. It is, of course, true that convoy may be an offensive operation in the underlying strategic sense—that was, in fact, the case with respect to the majority of United Nations convoys in World War II—but convoy *tactics* are and always will be inherently defensive in character. Should the tactics of any convoy be changed to those of an offensive nature, the operations involved would cease, as of that instant, to be convoy operations and would become those of an attack force. In other words, the mission of any convoy is to insure the safe and timely arrival at destination of the ships and cargoes which compose it. Protection and defense to accomplish that mission are the ends toward which both its organization and its functioning are directed.

Except in those extremely rare cases when a belligerent holds absolute and undisputed control over a sea area or lane, he is compelled to employ convoy in order to safeguard his vital maritime communications. To this end he may—and normally he will—combine with his use of convoy some other form of shipping protection

such as patrol of the critical area or lane, or employment of a covering naval force, or the establishment and operation of intermediate bases along the communication line; but the paramount burden of insuring adequate security for his overseas transportation and supply must be borne by his convoy system. This he must organize and adapt to meet the factors inherent in the strategic situation existing between himself, his opponent, and all affected neutral or nonbelligerent markets. His plans must be based particularly upon the following:

1. The enemy forces which threaten the communication line in question,

2. The forces which he, himself, can make available for escort duty,

3. The types and the peculiar characteristics of the vessels to be convoyed,

4. The nature of the cargoes to be carried and their strategic importance,

5. The weather conditions along the routes, and

6. The delays inherent in the use of convoy, and the loading and discharging facilities available at the contemplated terminal ports.

In the war recently ended, Great Britain, initially, and subsequently joined by the United States, was confronted by the necessity for organizing and placing in operation a vast convoy network in the shortest possible time. For both of these powers, the most critical areas lay in the North Atlantic and the most deadly threat was that offered by the Central European Axis. The South Atlantic sea lanes, and those of the Pacific and Indian Oceans, while of great importance to them, were never the scenes of duels between their shipping and its would-be destroyers as cruel and crucial as those which took place in the areas lying north of the Carribean-Gibraltar line. In the case of the British Empire, the vital flow of cargoes was almost entirely inward to the Isles—imports of food and supplies; in the case of the United States, it was almost equally preponderantly outward—exporting the raw materials, manpower and processed munitions to the other United Nations powers and to the battlefields of the world.

Japan's entry and subsequent part in the war did not alter these values materially; insofar as the battle of deep sea shipping was concerned, World War II unfolded an amazingly accurate repetition of the history of World War I. Both England and the United States drew heavily upon their joint fund of previous experience in the earlier conflict, in countering the submarine threat. The armistice in 1918 had found the two powers in possession of a well integrated system of convoy in the North Atlantic which had proved its efficiency against the German U-boat. When Hitler struck in 1939, that organization provided a foundation and starting point for the construction of the new network—but it was a starting point only, not in any sense a complete and functioning organization, fit and capable of challenging the Axis attack in its revitalized and more destructive form. The U-boat had acquired higher speeds, both surfaced and submerged, much longer operating radius, improved equipment for locating and destroying its quarry and an entirely new tactic of coordinating multiple attack. The airplane had entered the picture as a *direct* menace to shipping, second only to the U-boat, itself, in destructiveness. Further, by operating in conjunction with the submarine, the aircraft now served to multiply the deadliness of the latter many times over.

Britain and the United States were forced to revise drastically both the organizational and the operating doctrines which had served so well in 1917-18, to meet these new features of the enemy campaign. As a result, it was nearly four years after the original outbreak of the war in Europe before the United Nations convoys, together with almost superhuman accom-

plishments in new ship construction, were able to turn the tide, and establish, for the first time in the war's records, a figure in the black under the vital entry of ship replacements versus ship losses. Those were four years of experiment and adaptation, frequently with the most disheartening results, before the balanced trilogy of correct organization, correct escort strength and position, and correct tactics under attack, were arrived at. The first of these three, convoy organization, is of primary interest to us in this discussion.

Before going into any consideration of the specific details of World War II organization of Anglo-American convoys, it would be well to clarify a few of the more important terms used.

A *convoy* was, strictly speaking, a group of merchant vessels or naval auxiliaries, or both, assembled and organized for an overseas passage together. In this abstract definition of the term, it will be noted that no mention of escort is made. In practice, in World War II, an escort was invariably assigned to the United Nations convoys, and custom and usage combined to bring about the inclusion within the meaning of the term "convoy" of not only the shipping under escort, but also the escorts, themselves. There is no harm in this loose interpretation of "convoy," provided that the command relationships throughout are clearly understood, and provided, too, that sight is not lost of the fact that the escort for a given convoy might be changed at any time in the course of its passage. For the purposes of this article, it promotes clarity of understanding to employ the more accurate definition of convoy as *not* including the escort; that is the meaning which is used herein and when it is desired to refer to the combined convoy and escort as one entity, the designation "convoy operation" is used.

An *escort* comprised one or more combatant ships or aircraft, or both, assigned to accompany and protect the shipping in a convoy.

The *Convoy Commander* might be either a naval officer or an officer of the Merchant Marine; he was usually a naval officer. He was called the Convoy Commodore. His responsibilities were numerous and broad, including as two of the most important, the conduct of the cruising formation of the convoy and the maintenance of discipline within it, and all intra-convoy signalling. In large convoys—a description which was applicable to nearly every one which was operated in the Atlantic in the late war—the Convoy Commodore was assisted by a Vice Commodore and one or more Rear Commodores. These junior commodores might be either naval or merchant service officers. In U.S. overseas trade convoys it was the normal practice to appoint a naval officer as Vice Commodore and to select the Rear Commodores from among the most experienced merchant ship masters present in the convoy. The Vice and Rear Commodores were so designated primarily to ensure continuity of command within the convoy, but they were also of particular value when it became necessary for the convoy to split into groups, either to reach different ports of destination, or for any other reason.

The *Escort Commander* was the senior naval officer of the escort. He was responsible for the protection of the convoy. Ordinary service seniority determined succession to command within the escort.

The exercise of command in a convoy at sea entailed problems which were unique in the normal functioning of military command. These stemmed, for the most part, from the inevitable rapid expansion of the merchant marine to meet the emergency and from the complications which attended the unaccustomed grouping of large numbers of vessels into tight steaming formations. Under these circumstances, the disastrous consequences which were likely to attend failure to keep proper

station or to maintain close supervision over smoke and ship darkening had to be impressed on all in company. The only course open to the Convoy Commodore, when he found it necessary to discipline a ship for serious violations of doctrine, was to order her to drop out of the convoy and to proceed independently among the stragglers' route. While this extreme measure was adequate to correct the faulty practices on the part of the ship concerned and proved effective by force of example on other slack performers in the same convoy, it was to be avoided except as a last resort for obvious reasons.

Even the seriousness of these violations of security doctrine, however, was transcended by the absence of long experience and thorough familiarity with the problems of seamanship involved in maneuvering merchant vessels in close ranks. This remained the gravest single difficulty in the whole field of U.S. convoy operations throughout the entire war. Unremitting efforts were made to overcome it; special training and refresher courses were instituted and made mandatory, and publications were revised again and again with that end in view; but maneuvering hazards remained bitterly costly right up to the end of hostilities. As an illustration of just how costly, it is a recorded fact that, even as late as the first six months of 1944, after four years of wartime experience, more U.S. vessels were lost to maritime disaster than to submarine attack.

Command of a convoy operation, embracing overall command of both the convoyed vessels and the escort, was governed by the following doctrine:

(a) In a regularly scheduled merchant ship convoy, the Escort Commander exercised overall command. This was the case whether or not there was a naval officer present in the convoy who was senior to the Escort Commander.

(b) If the convoy was not a regularly scheduled one, both it and the escort were normally formed as a special task force, task group, or task unit. Under these circumstances, the authority who ordered the operation originally and designated the task organization to carry it out might assign any officer desired to exercise the overall command. Frequently, largely because his communications facilities were generally superior to those of transports or cargo vessels, the Escort Commander was so assigned even though he might be considerably junior to other officers present in the group or force. When the originating authority did not specify the officer in whom the overall command was to be vested, the senior naval officer in the entire grouping, whether he was in the convoy proper or in the escort, automatically assumed the responsibility.

Side by side with the task of establishing command and succession in the convoy organization, was another of the basic problems—that of assigning to the individual ships their cruising stations in the convoy formation. This was done as soon as the identities of the vessels which were to make up the convoy became known and the nature of their cargoes had become definite. In order to assign stations properly, it was essential that accurate information be at hand as to each ship's speed, expected draft and trim on clearing the harbor and again on arrival off the port of destination, propulsive equipment, radio and signalling facilities together with the personnel therefor, armament, special protective devices, such as radar, sound detection, degaussing, etc., classified publications held on board, character of cargo, and a host of similar details. With this information available, the formation to be employed was determined and the station to be occupied in it by each ship was decided upon.

The nature of her cargo on the particular voyage in question was usually the prime determining factor in fixing the

station of a vessel in the formation. Tankers, ammunition ships and carriers of any highly inflammable or explosive cargo were placed in the interior of the formation, near the center. Vessels loaded with any especially important or valuable materials, equipment or troops were likewise assigned to interior stations. Ships with general run-of-the-mill cargoes were normally placed in the flanking columns and in the rear. Vessels having equipment making them capable of performing specialized duties were stationed with a view to promoting maximum effectiveness of that equipment in giving service to the convoy as a whole. For example:

(a) *Sound signalling* equipped ships were stationed in the van and at regular intervals throughout the formation to repeat sound signals. In broad front convoys, they were frequently located at the head of each ship column; however, variations of this arrangement were often made to accommodate special circumstances.

(b) *Light repeating* ships were designated from among those equipped with the merchant vessel emergency colored maneuvering light systems. It was their function to repeat signals in that system which were originated by the Convoy Commodore in his flagship in the van. Although voice radio replaced such signals as the primary emergency signal channel in the latter part of the war, it continued to be imperative that such radio be paralleled by visual methods, so the light repeating ships were still necessary. They were stationed in much the same locations in the formation as the sound signal repeaters.

(c) *High frequency radio* equipped vessels were assigned to guard the various vital HF channels used for inter-convoy and convoy-to-shore communication. These ships were normally stationed in the vicinity of the flagship of the Convoy Commodore to permit rapid visual transmission to him of any important messages or intelligence which might come in by that means.

(d) Vessels equipped with *special protective* armament or apparatus, such as radar, smoke generating batteries, depth charges, etc., were stationed so as to exploit to the maximum the tactical potentialities of such apparatus. Normally, they were placed in van and outer flank positions.

The final, and among the most vital, features of the convoy organization were the conferences held just prior to the departure of the shipping—usually on the day before sailing. There were three such final conferences and they were conducted, normally, in the offices of the Convoy Routing Officer of the pertinent Sea Frontier Headquarters, or those of the Port Director of the port of departure. These conferences were:

(a) A *communications* conference, attended by the communications personnel of all ships in the convoy, which covered the Communications Plan (or annex, in army terminology) for the operation, the assignment of intercept radio guards, the distribution within the formation of all messages received, matters of radio and signal security, etc.

(b) An *Armed Guard* conference, attended by the commanding officers of the armed guard units of all merchant vessels in the convoy. Recognition of enemy vessels and aircraft, fire distribution and "hold fire" doctrine under attack, assignment of sectors of primary responsibility for maintenance of lookout, and similar subjects formed the agenda of this conference.

(c) The *Masters'* conference followed the communications and armed guard conferences. It was attended by the convoy commodore and his staff, the vice and rear commodores, the masters of all ships in the convoy, the commanding officers of all armed guard units, the escort commander and the captains of all escort ships as-

signed to the operation and which were in port at the time.

The operation plan and all orders for the voyage were gone over at the masters' conference. Detailed information as to each vessel's characteristics (the same information as that listed above in the discussion of the assignment to stations) was distributed to all other ships in the operation. The station assignments and special duty allocations to specially equipped ships were reviewed and confirmed. Late information on enemy activities and the probable enemy order of battle in the areas through which the convoy must pass were gone over and evaluated. Intelligence of any proximate friendly forces was given out. Salient points of doctrine were reemphasized, particularly those bearing on security during the passage. All personnel present at the conference were given the opportunity to raise any question, the answer to which might not have been clearly and completely brought out before the conference was adjourned. At the end of the gathering, each master was handed a set of sailing orders (sailing orders are analogous with operation orders) with all annexes. The final item on the conference agenda was the "convoy check-off list." The list served to re-emphasize all important points covered in the conference, and it was the only check by means of which the convoy commodore could reassure himself that every precaution had been made for the coming voyage. The list was required to be examined and signed by each master prior to departure, irrespective of whether or not his ship had traveled in convoy before.

The masters' conference was the last step taken in the process of organizing the convoy. When the agenda outlined above had been completely covered and the conference was announced as adjourned, the personnel involved returned to their respective ships and awaited the arrival of the ordered hour of getting underway.

. . . The effectiveness of the convoy system, after adequate escort vessels and air protection had been provided, was beyond question. The Army's losses from enemy action were relatively light. Leaving aside losses sustained during amphibious assault operations, 4,612 American soldiers were lost on 79 vessels sunk or damaged, and 737,704 measurement tons of Army cargo were lost on 148 vessels sunk or damaged. The troop loss constituted only 0.063 per cent of the total outbound passenger traffic, and the cargo loss only 0.58 per cent of the total outbound cargo traffic.

Report of the Chief of Transportation

Improving
The Soldiers' Food

From the Office of the Quartermaster General

"High morale among troops is one of the greatest factors necessary in order to win battles. It is equally important to maintain morale in the peacetime Army in order to accomplish the present War Department mission and to be ready for any unforseen emergency which might arise. In order to attain and maintain this high state of morale, food must be prepared in a palatable and appetizing form and in such a manner that the nutritive value is retained." Paragraph V, 1, War Department Circular No. 100, 18 April 1947.

Quartermaster Corps Food Research Program

THE problems involved in designing combat rations that will contain the necessary nutrients, remain stable under all climatic conditions for many months, be well adapted for the purposes for which they are intended, and that will be fully acceptable to all the men, under every condition, are numerous and complex.

Not the least is the fact that our citizen soldiers come from different sections of the country. They come from families with different levels of income, from different occupations, different racial and religious groups. Their food habits vary greatly. Men from the South may like hot biscuits and hominy grits. Those from New England may have been brought up on boiled dinners. Some men consider food unappetizing unless it is highly seasoned. Preferences also differ as to methods of preparing the same food.

The Quartermaster Corps is now conducting a survey in every State of the Union to learn which foods are eaten in every region and the preferred methods of preparation. The studies include meal patterns, food peculiarities, and differences of preference due to locality, race, age, and other factors. From this study it is expected that a list of foods will emerge—perhaps not more than 125—which are nationally acceptable; that is, foods that are eaten by all the people of the United States.

Environmental factors have an important bearing on the soldier's attitude toward food. These include climate and topography, and conditions of support and survival. The sights, din, and odors of battle are likely to affect the soldier's willingness to eat certain kinds of foods and his inability to eat others. So also are stresses such as anxiety, fear, monotony, and fatigue.

In Quartermaster laboratories experiments are being made by feeding animals under conditions of excitement and stress. Soldiers are volunteering for tests covering the effects of different kinds of foods upon the physical and mental processes, and on the minimum caloric intake needed for the utilization of proteins.

Size and weight are matters of convenience but not essential with foods packed for domestic consumption, but

weight and bulk are extremely important in Army rations because of the premium on shipping space, and because every ounce of weight added to the soldier's load decreases his battle effectiveness.

While foodstuffs intended for civilian consumption reach the consumer within a few weeks after they leave the processing plants, similar items for military use may be in the supply lines for nine to twelve months before they are eaten. Military foods must often be shipped great distances, handled several times, and stored under adverse conditions. This makes it necessary that military rations receive special attention in preparation and processing, as well as in packaging and packing. With the far-flung military installations of the United States Army in World War II, these problems were multiplied many times. It became essential for the Armed Forces to set up facilities for the preparation and packaging of foodstuffs that would meet modern military requirements.

Many things were learned during the war in the research and development laboratories engaged in solving the military feeding problems. Better and more stable foods were produced for the Armed Forces, and some of the discoveries made in this work are now being reflected in the feeding of the civilian population.

For example, at the beginning of the war, powdered eggs had a shelf life of only a few weeks. As a result of the research and development work carried on by the Quartermaster Corps with the cooperation of industry, powdered eggs are being produced today that will keep as long as twelve months under the most adverse storage conditions. Improvements have also been made in the keeping qualities, as well as the acceptability, of powdered milk.

The entire fields of food and nutrition are covered in the research and development program now being conducted. This work, centering in the Quartermaster Food and Container Institute for the Armed Forces, at Chicago, is being carried out in eighty-five universities, technical schools, and research foundations, and in more than 500 industrial corporations.

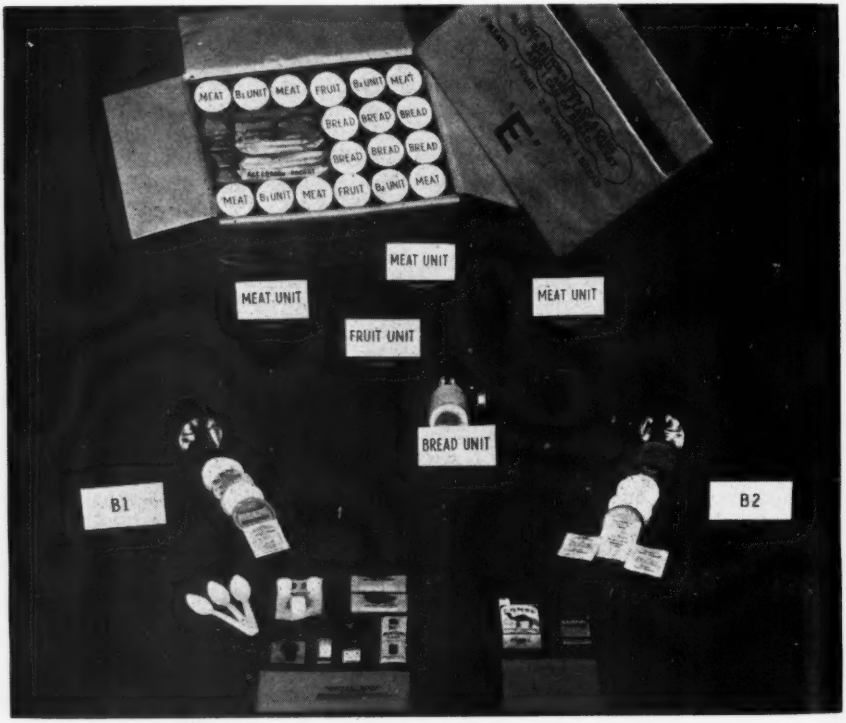
Results of this cooperative program are being realized in greatly improved methods of dehydrating foods; in canned meats that are more nutritious and more palatable; in rice that can be cooked in three minutes; and in pre-cooked frozen foods that will permit the housewife to prepare a complete meal in less than a half hour. These are only a few of the improvements already achieved. Many more are under way which not only will contribute to the improved health, well-being, and efficiency of the soldier, but will also greatly relieve the drudgery of food preparation in the home.

An important achievement of the research and development program was in the packaging and packing of foodstuffs for military use. Almost all operational rations shipped to the Armed Forces overseas were packed so they could be stored out of doors in any climatic condition and would remain stable for long periods of time. This single item saved the Government millions of dollars that otherwise would have been expended in the construction of warehouses and storage space at overseas depots.

New types of individual packing were developed and this work is continuing. In the Quartermaster laboratories today are loaves of ordinary bakers' bread in a recently developed wrapper that keeps the bread fresh for two months. New vegetable fiber containers have been developed for pre-cooked foods that can withstand oven temperatures of 400 to 500 degrees Fahrenheit and not show any signs of scorching. They resemble the ordinary paper plates and cups.

A project is under way for the development of containers that will carry frozen foods for considerable periods of time without any additional refrigeration. An

experiment has just been completed in which frozen meat was kept in a container for forty-three days at an outside temperature of eighty degrees. When the meat was removed from the container it was still solidly frozen. If this item is developed to the extent anticipated it may make possible a new method of insulating trucks, railroad cars, and ships, and thus eliminate the need of icing or mechanical refrigeration. It may change the methods of construction of refrigerators and revolutionize the conception of insulating buildings.



Components of the E ration.

The Quartermaster food research and development program has made obsolete all the operational rations that were used in World War II. New rations have been developed, or are in the process of development, that will find greater acceptability, have better stability, and be more readily usable than any of their predecessors.

The new E ration, containing 3,870 calories, was tested for thirty days with troops engaged in mountain-climbing activities at Camp Carson, Colo. Eating no other food than that contained in the ration, the men maintained full health, vigor, and weight for the entire period and they did not tire of the components.

The new 5-in-1 ration, designed for the

feeding of small groups separated from their kitchens, is also showing encouraging results from field tests. It has an increased number of fruit components, includes canned bread and canned whole vegetables, and all dehydrated items have been eliminated. The accessory items have been adjusted in accordance with needs indicated by war experience. Work is progressing in the design of a ration suitable for in-flight feeding of air crews. An advanced type of assault ration which would be carried by the soldier on his person while he is on a mission separated from all sources of re-supply is also being tested.

Feeding under Arctic conditions presents new challenges in ration design. The effects of atomic blast, heat, and radioactivity upon foods constitute another field of exploration so that proper defensive measures may be developed.

Research and development planning is directed toward improving the efficiency of rations and at the same time lightening weight and lessening bulk. All rations must be designed for air transport and packaged for free-fall drop from planes.

The health, morale, and effectiveness of the Armed Forces will depend upon how well they are provided with food that is fully adequate under every condition under which the soldier may be called upon to live and fight. To maintain the American soldier as the most efficient soldier in the world, it is necessary that he be the best-nourished soldier.

By being able to furnish foods that contain all the essential elements in palatable form, the standards of nutrition in the civilian population are being constantly raised. The results of the food research program will also be helpful in solving world food problems by discovering and developing foods that are more stable, more useful, more nutritious, and more acceptable.

Mess Improvements

In addition to the improvements in the field rations, discussed above, the Army is seriously attacking the problem of improving the quality of its messes.

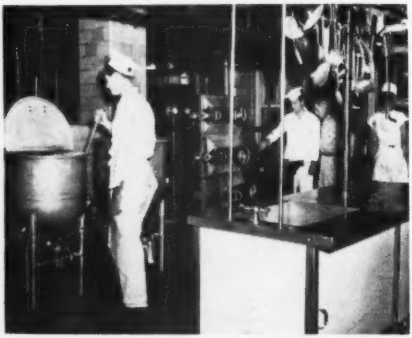
Striking directly at the source, namely the proficiency of food service personnel, machinery has been set in motion for improving the qualifications and efficiency of all officers, warrant officers, and enlisted men who are charged with the responsibility of supervising and preparing, serving and conserving food.

The new 5-in-1 ration.

While the qualifications of food service personnel are being raised, the incentive to improved performance is likewise being elevated. The plan provides that food service in the army shall be made inviting as a career. Those who participate in it will be more carefully screened for educational background, aptitude, and proficiency. Courses of training will be more exacting, and those who qualify will receive higher grades than before and will have the opportunity to advance steadily as far in the

service as their capacities can carry them.

As before, the operation of the army mess will be a command responsibility. So also will be the operation of the food service schools established in each Army Area. The training of subsistence officers and master bakers, and instructors who serve in the Army Area food service schools will continue to be the function of the Quartermaster Corps. The Quartermaster, as heretofore, will prepare curricula for the food service schools, and provide all training aids. A new function of the Quartermaster Corps is to provide inspection of food service schools, the army mess-



Food Service School kitchen, Fort Benning, Georgia. (Signal Corps photo.)

ing system, and individual unit messes. These inspectors will report their recommendations directly to the general staff.

The regulation providing for advancement of food service personnel is contained in War Department Circular 50, which implements General Eisenhower's statement: "Food must be prepared in a palatable and appetizing form and in such a manner that the nutritive value is retained." The Chief of Staff added that food conservation must be promoted, the quality of foods procured must be adequate, food service personnel must be adequately trained, and food service facilities efficiently operated.

Under the provisions of the new regulation the mess sergeant is re-designated mess steward, who will be a technical sergeant instead of staff sergeant. When the capacity of the mess is 750 or more the mess stewards will be master sergeants. Assistant mess sergeants in grade of staff sergeant are authorized for each mess of more than 200. A third assistant in the same grade is authorized when a mess of over 400 operates on a twenty-four hour basis and fifteen per cent of the ration load is consumed at night.

One-half of the cooks will be technicians third grade and one-half will be technicians fourth grade, a one-step promotion for both first and second cooks. One cook will be provided for each of the first twenty persons in each mess, or three for the first sixty in each mess, and one cook will be provided for each forty additional persons to be fed. No mess unit will have less than two cooks.

The present cooks' helpers will be replaced by mess attendants who will be in grades five, six, and seven, with one-fourth of the attendants in each unit in fifth grade. There will be not more than one attendant for each thirty-five persons fed in the mess, and not less than one attendant for each seventy-five. The number of attendants can be increased one-third in messes operating around the clock and serving fifteen per cent of the ration load at night.

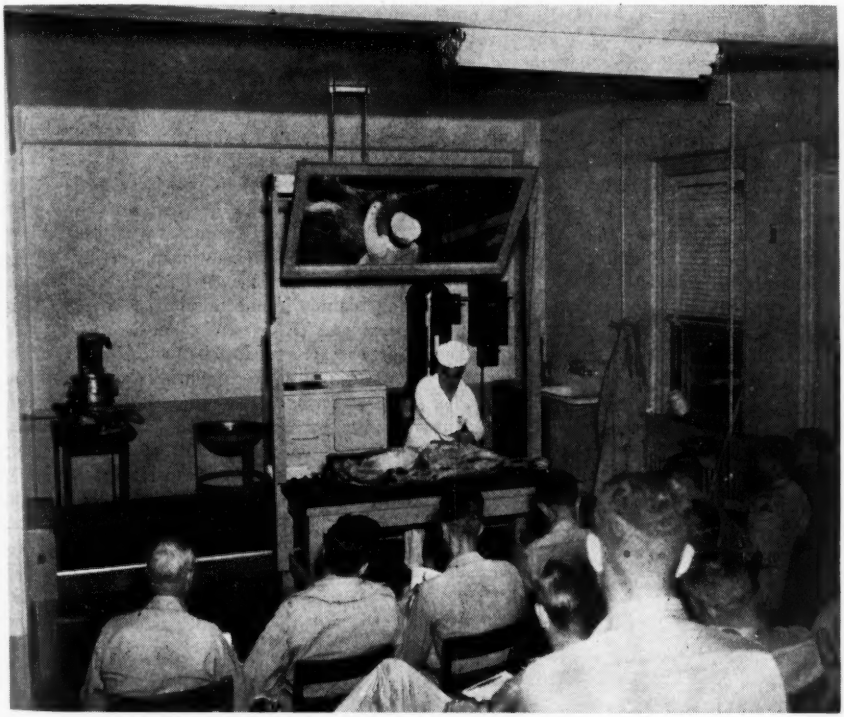
Consolidated messes will be staffed on the same ratios, except that when the capacity of the mess is more than 2,000, the mess steward will be a warrant officer. A second assistant mess steward is authorized for messes of more than 750 persons.

A new officer title, Food Service Supervisor, has been established with these duties: development of measures for improvement of food services, food consumption, and the elimination of food waste; study of food preference, food qualities and quantities, mess operation, and related

matters; preparation of recommendations and directives and the furnishing of guidance in their implementation; inspections to insure the enforcement of pertinent regulations and instructions with respect to mess operation and other food service agencies, in coordination with the surgeon and quartermaster concerned; coordination of training of food service personnel to provide for efficient operation of messes and related food service activities.

The office of Food Service Supervisor carries rank ranging from first lieutenant to lieutenant colonel, depending on the size of the command. They serve as staff assistants to commanders for the food service program.

To qualify for mess steward or assistant steward the soldier must have an Army General Classification Test score of 100 or higher; be a grade-school graduate; be free of communicable diseases; have held the cook's rating for six months and performed the duties of first cook for three months satisfactorily. In lieu of this, he must have served as mess sergeant, or completed Course B (mess management course), or an equivalent course, or be a graduate of the old Cooks and Bakers School. On and after 1 June 1947, no sol-



Demonstration of meat cutting, Food Service School, Fort Benning, Georgia. (Signal Corps photo.)

dier will be given assignment as steward or assistant steward unless he holds MOS 824 through completion of Course B or through prior experience, and on and after 1 June, MOS 824 will be given only to successful graduates of Course B.

First and second cooks (MOS 060) must have an AGCT score of eighty-five; be grade school graduates; be free of communicable diseases; have been a cook's helper for three months, or held MOS 060 through prior duty as a cook, or by completion of cook's Course D or the old cooks and bakers course. On and after 1 June, men will not be detailed as first or second cooks until they have MOS 060, and after that date MOS 060 will be given only to graduates of cooks Course D.

Mess attendants must be free of communicable diseases, not have allergic reactions to food, and be interested in the assignment.

Food service technicians holding grades from corporal through master sergeant assist the food service supervisors. They must have AGCT scores of 100 or more; be high school graduates; be free of communicable diseases; have held for six months or more a rating as cook, baker, meat cutter, master baker, pastry baker, master butcher, mess steward, subsistence NCO, commissary steward, or administrative NCO (quartermaster). Persons detailed as food service technicians who are not graduates of proper courses will be assigned as students as soon as practicable.

Two schools are being operated by the Quartermaster Corps for the training of instructors and personnel. At Camp Lee, Va., courses are given to develop instructional ability and teaching methods among officers and enlisted personnel, who in turn serve as instructors in the Army Area food service schools. Subsistence procurement officers and master bakers are trained in special courses at the Quartermaster Food and Container Institute for the Armed Forces, at Chicago.

The Army Area food service schools are operated at these installations: Second Army—Ft. Meade, Md., and Ft. Knox, Ky.; Third Army—Ft. Benning, Ga.; Fourth Army—Ft. Sam Houston, Tex.; Fifth Army—Ft. Sheridan, Ill.; Sixth Army—The Presidio, San Francisco, Calif.

Once again, we have learned that preparedness is the guardian of peace, and particularly is this so in the age of the atomic bomb and guided missiles upon which we are entering. Let us not forget this important lesson, but observe it with national unity, so that our future shall be secure in peace, and our influence effective in stopping aggressors from daring to impose their will upon humanity.

General of the Armies John J. Pershing

MILITARY NOTES AROUND THE WORLD

JAPAN

Destruction of Chemicals

An unusual post-war problem in Japan has been the highly dangerous disposal of poison gas, chemical munitions, and an entire lethal plant in a project identified as Operation Lewisite.

An Inland Sea island near Kure, former Japanese Navy Base, has storage tanks, caves and warehouses of poison gas. The British, who occupy the region, figured five years would be necessary to decontaminate the threat. The Japanese calculated two years. An American Chemical Corps major estimated six months. He was lent to the British and his project proceeded on schedule.

This dangerous peacetime task required 900 Japanese personnel to destroy the heart of Japan's gigantic arsenal of chemical warfare.

Workers on the project experienced a series of adventures. They pumped out 12,000 tons of poison chemicals and 3,000 tons of mustard gas from 100-ton steel storage tanks onto steel barges with specially constructed holds, and sank them in the Pacific.

One plant the Japanese had built was copied from a French process. Another was an American type plant. Stacked like crated packages in a store were racks and shelves of toxic smoke cases, arsenic, cyanide and phenol for preparing sneezing gas. The finished product was shipped to Hiroshima where the Japanese maintained a sizeable chemical depot.—News reports.

GREECE

Dodecanese Transfer

The Dodecanese Islands have been transferred from a British to a Greek Military Administration, with sovereignty to pass to Greece.

The Dodecanese originally comprised the islands of Patmos, Lipsos, Leros, Calymnos, Cos, Nisyros, Tilos, Charki, Symi, Stampalia, Carpathos and Casos.

Since Italian occupation in May 1912, the Dodecanese have included also the islands of Rhodes and Castellorizo. Most of the population of 115,000 is Greek, with about 8,500 Turks. Of the 5,000 Italians who settled there between 1912 and 1939, most have already returned to Italy.—*The Times*, London.

AUSTRALIA

Rocket Experiments

Australia will tighten precautions to prevent foreign agents gaining information about defense projects, the Minister for External Affairs announced recently in Federal Parliament. He was speaking on security measures which were being taken to preserve secrecy on the rocket experiment to be carried out in South Australia. He said the rocket experiment was purely in connection with the defense of Australia and it was essential that the utmost precaution should be taken to prevent leakage of information. Everyone connected with defense experiments will be thoroughly checked.

Government leaders in Camberra also have discussed in detail the preparations for the future defense of Australia. This will include research into underwater radar, guided projectiles and long range rockets. A government spokesman asserted that because of the advancement of weapons of warfare, Singapore could never again be regarded as a safe place in Pacific defense. Sydney, on the other hand, because of its geographical location, is a much more strategic base and would assume greater importance in the future. The spokesman added that Darwin was important to Australia provided some arrangements could be made about Timor, 450 miles away, but it would never be used as a large naval base because of its poor harbor and extremely high tides. In other areas in the Pacific, Australia would be safe because America has bases in the Marshalls and the Carolines.—*Australian News Summary.*

ICELAND

US Troops Leave

Approximately six years of American military protection of Iceland ended in April, when the last contingent of United States troops embarked for home.—News reports.

CZECHOSLAVAKIA

Air Force

The Czechoslovak Air Force, which is subordinate to the Army, has been reorganized and it is evident that the reorganization has followed the Soviet lines, the Air Force being divided into Air Commands, and these subdivided into Air Divisions, and further still into Air Regiments.

The equipment has been obtained from Britain and the USSR together with a few captured German aircraft, and, as the majority of these aircraft are Russian, it is supposed that in the future the Russians will supply the greater part of the aircraft of the Czechoslovak Air Force.

Since the Czechoslovak Air Force is leaning towards the East, it is expected that its future role will be that of close support to the ground forces and that fighters and fighter-bombers will predominate.—*Journal Royal United Service Institution.*

INDIA

Airborne Troops

Disbandment at Quetta of the Indian Para Regiment does not mean that India's airborne troops are being abolished or reduced. Personnel are being absorbed into parachute battalions of the regular Indian Army.

The present formation of India's "army of the air" is the 2d Indian Airborne Division, consisting of three parachute brigades with an air reconnaissance regiment, a machine-gun battalion and airborne artillery.

Each parachute brigade has three battalions drawn from famous Infantry regiments of the Indian Army. These have received a high standard of training and the maroon beret of the airborne division is already the mark of crack troops.—*Indian Army Review.*

GERMANY

Propeller Die Press

Five times as powerful as the largest similar American machine, then in general use, is the 30,000-ton hydraulic die press with which the Germans "pressed out" propeller blades and other vital aircraft components during World War II.

The German press could turn out 1,940 32-foot wing-spar flanges or propeller blades in twenty-four hours. Wing-spar flanges, termed "caps" in Europe, are the strongest lengthwise supports of the wing frame.—Air Matériel Command.

"Cinetheodolite"

Boeing Aircraft has obtained two captured German "cinetheodolites" from the AAF, for which it is conducting tests with GAPA—ground-to-air pilotless aircraft. A highly-complicated mechanism, the cinetheodolite photographs guided missiles in flight, registers the reading of the traversing and elevating dials, and records on the film the time in flight. The course of the missiles can thus be fully plotted and their operation checked in all details. The theodolite records every essential detail of the tracking on the film.—*Aero Digest.*

Plane Detector

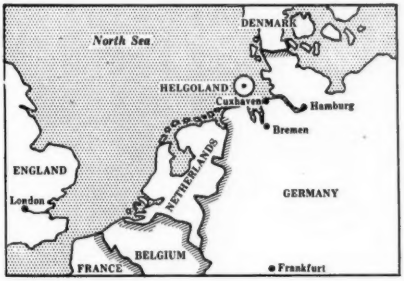
A German device for detecting approaching airplanes is a hot-wire microphone, said to be superior to the older electrostatic and electromagnetic types.

This microphone is for use on patrolling aircraft. Unlike other types it does not pick up mechanized vibrations produced by the carrier plane. It is particularly sensitive for sound waves between 50 and 250 cycles per second. With higher cycles its sensitivity decreases considerably.—*Science News Letter.*

Helgoland Destroyed

Helgoland, the once-formidable German North Sea fortress, has been destroyed by the British.

Thirty-five hundred tons of explosives planted among the submarine pens and coastal defenses of the island by the British Navy thoroughly wrecked the key military works of the base. The main objectives of the demolitions were the German submarine shelters at the south-



ern end of the island; two main coastal batteries and smaller batteries; eight miles of underground fortifications lined with concrete; and the upper galleries of the fortifications.—*The New York Times.*

Air War Potential

Germany's potential for waging aggressive aerial war has been largely removed by the Allied Control Authority.

This disarmament phase is now essentially complete: 4,000 German aircraft and 30,000 engines captured in the US Zone have been destroyed, surplus airfields returned to agriculture, and special equipment destroyed or converted to peacetime use. Certain basic controls over Germany's air potential must continue indefinitely. For example, the Air Forces Branch, working with the British, Russian, and French, helps keep check on certain of the more military ex-members of the outlawed German Air Force.—*Weekly Information Bulletin.*

USSR

Airborne Army

Information from Russia indicates that the Soviet Union's strength in troops trained for airborne operations may number as high as 100,000 men. Some strategists note that this reported strength may be misleading because of a possible Soviet deficiency in air transportation. Russia's primary aviation interest during the war was in fighter type planes. She virtually ignored heavy bomber aircraft, and what her strength in transport is today is uncertain. Lend-lease reports show that during the war the United States turned over to Russia about 700 transport airplanes.—*Associated Press.*

Russian Aircraft

Confusion has been caused in the past by the Soviet change-over from a prototype number to the normal system of designation. Russian prototypes may be identified by the prefix TsKB (Central Construction Bureau), and a series number. The TsKB-26, for example, was the forerunner of the DB-3, while the TsAGI (Central Aero and Hydrodynamic Institute) is another prefix which has been used, particularly for helicopters.

A few Russian aircraft have been given names—the widely publicized "Maxim Gorki" is one instance.

Although at present the Russian method of designation is not standardized, it appears to be only a matter of time before the change-over to the "designer's name" system is complete. Once the system has been generally accepted, it is possible that more aircraft will receive individual names and the emphasis will be laid on the name, rather than the designation, especially types to be built in large numbers and brought to the attention of the Russian people—such as civil transports and light airplanes.—*The Aeroplane Spotter.*

GREAT BRITAIN

British Aid to Allies

Details of the mutual aid given by the United Kingdom to the United States, Russia, China, and the allied European countries show that from March 1941 up to 1 September 1945, the total value of that assistance amounted to 2,078,500,000 pounds. The United States received by far the biggest value in the form of reciprocal aid—1,241,402,000 pounds, representing sixty per cent of the aggregate total. It was mainly due to the presence of the large American forces in England.

During the five years mutual aid was extended to Russia up to 8 November 1945, assistance amounted to 318,000,000 pounds —fifteen per cent of the aggregate total and principally in military supplies.

Reciprocal aid to the United States was twenty-six per cent in the form of servicing United States forces, eighteen per cent for building capital installations, and fifty-six per cent food, materials, and equipment. Munitions did not form a significant proportion because the Americans brought most of their equipment with them. Their requirements were chiefly for replacement training purposes.—*The Times Weekly Edition.*

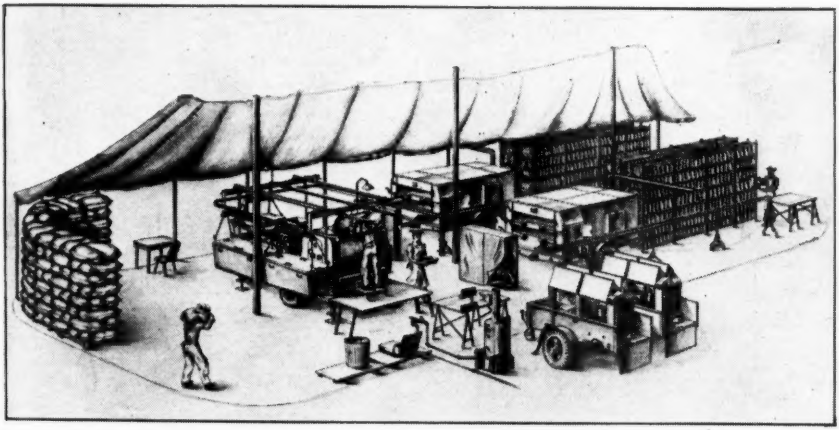
CANADA

The Reserve Forces

The Defense Minister has announced modified plans for the reserve forces. From a projected strength of 180,000, the army reserve is down to 50,000. The Navy's 18,000 reserve force has been reduced by two-thirds. The RCAF faces less drastic cuts; total Auxiliary and Reserve strength of 14,500 will probably be reduced to between 10,000 and 12,000.—*Aviation.*

UNITED STATES

New Mobile Bakery Produces 17,000 Pounds of Bread a Day

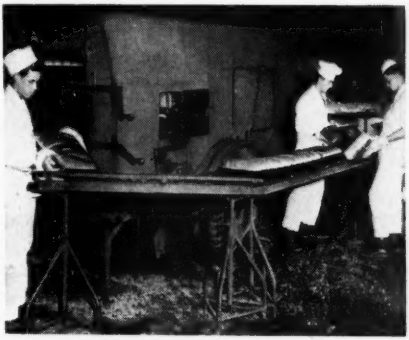


A new mobile bakery unit, has been developed by the Quartermaster Corps since World War II. One platoon unit, operated by forty-seven men, can produce 17,000 pounds of sheet bread a day. The unit can be knocked down for moving in 1½ hours and reassembled in 2 hours.

The United States entered the war with the World War I-type of mobile bakery, plus an improved portable unit. It was soon learned that the mobile equipment was inadequate.

The new platoon unit consists of five trailers, all of which may be airborne. Two of the trailers carry gasoline-driven electric generators, two carry the ovens, and the fifth is a machinery trailer carrying the mixer, divider, moulder, and dough troughs.

The mixer, divider and moulder are mounted on the same trailer. Additional equipment includes collapsibile racks for proofing and bread storage, zipper-equipped canvas rack covers, ingredient scales, electric humidifiers, over-and-under dough scales, water pumps, conveyers and assembly tent.



Oven Unit.

Three platoons with a total of 141 men can produce 51,000 pounds of bread a day with a peak capacity of 60,000 pounds.—Office of the Quartermaster General.

Navy XHRP-1 Helicopter

The Navy XHRP-1 helicopter shown here demonstrates its unusual load carrying ability by taking off with a jeep weighing over one ton suspended beneath it. It was built by Piasecki Helicopter Corporation in collaboration with the Navy Bureau of Aeronautics.

This is the first time a military load of any significance had been carried by a helicopter, and the achievement broadens the scope of the helicopter tremendously as a piece of military equipment.

Development of this new type helicopter was instigated during the war to fulfill Navy requirements for an aircraft to perform rescue operations with the fleet and to transport personnel and essential cargo between ships and shore.

Powered by a Pratt & Whitney 600 h.p. engine, it can take off vertically with more than a ton of useful load, accelerate to speeds of over 100 miles per hour, and climb to high altitudes. Normally designed to carry a crew of 2 plus 8 passengers, it can also be used for heavy cargo or as a flying ambulance, capable of accommodating 6 litter patients. It can also serve as a medium range rescue machine, capable of rescuing 7 or 8 people within ranges of up to 300 miles.—News reports.

Physical Defects in Draftees

The ten leading causes for Selective Service rejection from April 1943 to December 1943 were:

Mental diseases	17.9
Mental deficiency	14.2
Musculoskeletal defects	8.9
Cardiovascular	7.0
Eyes	6.3
Neurological conditions	5.0
Ears	4.7
Syphilis	3.7
Nonmedical	3.3
Total	71.0

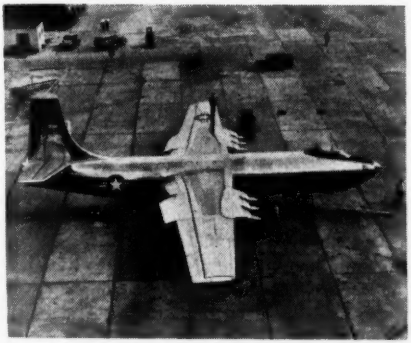
All other causes were twenty-nine per cent.

When white and colored inductees were compared, mental disease (14.2 per cent) was the leading cause for rejection in the former and syphilis (30.4 per cent) for the latter.

In contrasting these findings with the defects found in drafted men in World War I, some very striking differences are found. Flatfoot, constituting twelve per cent of all causes for rejection, led the list in World War I. Hernia was second. Defects of vision was third. Hernia and flat feet were grouped under one head in the statistics as mechanical defects. Defective physical development was also a large group. This contained men below the standards set for height and weight and chest expansion. It was felt afterwards that the standards set were too high and not enough consideration had been given to the lowering of height and weight in the population.

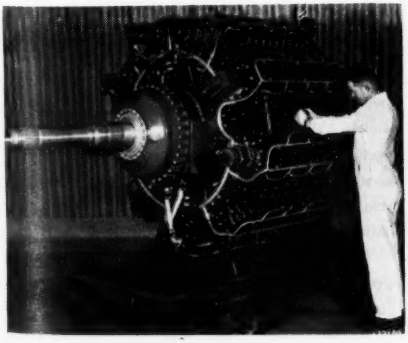
Organic diseases of the heart were important in both groups of statistics and the crippling effects of certain infectious diseases such as the streptococcal diseases, rheumatic fever, scarlet fever, and sore throat were indicated by the physical examination in both wars. The same can be said of syphilis as a reason for heart conditions.—*U.S. Naval Medical Bulletin.*

Six-Jet Bomber



The XB-48 is a new high-speed six-jet bomber. Built by Glenn L. Martin Co., it has a wing span of 108 ft 4 in, and length of 85 ft 9 in. Its landing gear consists of two main wheels in tandem under the fuselage and small wheels located near each wing tip.—AAF photo.

5,000 Horsepower Engine

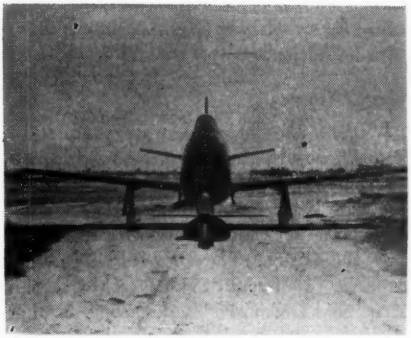


World's largest reciprocating aircraft engine is the XR-7755, Lycoming-built 5,000 horsepower liquid-cooled power plant. It contains nine banks of four cylinders each, and consumes 280 gallons of gas per hour.—*Aviation News.*

Drone Plane Equipment

Ground radio control centers such as the above are used in long distance bombing flights of B-17 "drone," or radio controlled, aircraft.—AAF photo.

Navy Jet



The XFJ-1, built by North American, incorporates the air intake and engine in the fuselage, and features a very thin wing and speed over 500 mph.—Navy photo.

Miscellaneous Notes

Renew Arctic Tests

Infantry troops and troop carrier aircraft are scheduled to engage in joint Arctic exercises in Alaska beginning in November. The exercises are an outgrowth of last winter's maneuvers with new emphasis on "air transportability" of infantry troops under cold weather conditions.—News reports.

Water Jeeps

The Navy has recently purchased 982 deep water fording kits for the Marine Corps with which ordinary jeeps can be made to operate under six feet of water for periods as long as forty-five minutes. Once waterproofed by use of the kit parts and materials, a jeep can be operated either on land or water.—*Marine Corps Gazette.*

New Supersonic Plane

A successor to the Bell XS-1, supersonic research plane, is the XS-2, being built for the AAF. The XS-2 has a stainless steel body and is rocket powered. The conventional wing pattern of the XS-1 is replaced by a swept-back wing designed to attain higher speeds.—*Army-Navy Register.*

Water Tunnel

Within two years, a water tunnel believed to be the largest in the world, will be completed at the Ordnance Research Laboratory of Pennsylvania State College under an agreement between the college and the Navy. The tunnel will have a capacity of about 130,000 gallons, constructed as a closed circuit, with circulation by an adjustable pitch propeller. Water speed from four to thirty-five nautical miles per hour will be produced for research on body shapes for submarines and torpedoes and development of propellers.—*Science News Letter.*

Ram-Jet Planes

Scientists are predicting ram-jet airplanes that will double the speed of sound. Flying in the stratosphere, the ram-jet motor will require only a tenth of the fuel needed just above sea-level. The practicability of the ram-jet was demonstrated in the Navy Bumblebee supersonic anti-aircraft weapon designed to counter Japanese suicide planes. Much simpler in construction than conventional reciprocating engines, the ram-jet in its 1,400 miles per hour form develops one horsepower for each half ounce in weight compared with about a pound for ordinary engines. A ram-jet developing 2,000 horsepower will be so light that one man can lift it.—*Science News Letter.*

Antarctic Claims

Reports that the United States had made formal claim to the Antarctic continent as a result of the recent American expedition were denied by Rear Admiral Richard E. Byrd on his return from the Antarctic. The Admiral said he had never requested the United States to stake out polar territory claims, and he did not consider the Antarctic strategically useful for military operations. Later, Admiral Byrd said he opposed control of the Antarctic by the United Nations, and that the smaller nations of the Southern Hemisphere with a direct interest in the region should have more to do with the Antarctic than the world organization.—*The New York Times.*

V-Rockets Obsolete

The AAF now considers the V-1 and V-2 rockets obsolete weapons and is concentrating on new supersonic guided missiles. The V-rockets still have a practical use, but only as research models in developing new long-range supersonic and guided missiles and in the search for defense against guided missiles.—*Associated Press.*

FOREIGN MILITARY DIGESTS

The Allied Expeditionary Air Force

Digested by the MILITARY REVIEW from an article in "The Aeroplane" (Great Britain) 24 January 1947.

THE Dispatch by Air Chief Marshal Sir Trafford Leigh Mallory concerning the Air Operations by the Allied Expeditionary Air Force (AEAF) in Northwest Europe from 15 November 1943 to 30 September 1944, is not only an account of the work of the Air Force, but a survey of the whole campaign, including ten and one-half months of the most heavy and concentrated air war in history.

As Air Commander in Chief of the Allied Expeditionary Air Force under the supreme command of General Eisenhower, Sir Trafford Leigh Mallory exercised operational command of the RAF Second Tactical Air Force, the United States Ninth Air Force and the Air Defense of Great Britain.

During the preliminary period of preparation for the assault, the medium and light bomber forces of the AEAF continued to support Operation "Pointblank," the combined bomber plan of the strategical bombing forces, the aims of which were to reduce the fighter forces of the German Air Force, a general reduction in the war potential in Germany, and the weakening of the will of the German people. In April 1944, the direction of strategic air forces passed to the Supreme Allied Commander for all operations in connection with the campaign. The Air Operations Planning Staff of Supreme Headquarters was moved to HQ, AEAF, and a small operational organization known as the Advanced Allied Expeditionary Air Force was established under Air Marshal Arthur Coningham, and given the task of directing and coordinating the planning and operations of such forces of the US Ninth Air Force and the RAF Second TAF as were allotted to him.

Headquarters Advanced AEAF was set up at Uxbridge and had a Combined Control Center manned by a British/American staff. This Center planned, coordinated and controlled all fighter operations in the initial phases. A Combined Reconnaissance Center was also operated. Main Headquarters AEAF moved to the Continent on 8 September, and with Supreme Headquarters to Versailles on 19 September.

Air Chief Marshal Leigh Mallory laid considerable stress on the importance of preparatory bombing to impose the greatest possible delay in the movement of enemy reinforcements and supplies. His plans included intensive bombing of railways, marshalling yards, repair centers, road and rail bridges, coastal batteries, enemy naval and military targets and the radar chain. A bombing plan was prepared to drive the German fighters to bases as far from the battle as were the Allied fighter forces, and consideration was also given to maintaining a sufficient bombing attack on flying-bomb and rocket sites.

Plans for the use of air power in direct support of the assault were: (a) to protect cross-Channel movement against air attack and to assist the Naval forces to protect the assault craft; (b) to neutralize the coast and beach defenses; (c) to protect the landing beaches and shipping concentrations from air attacks; and (d) to dislocate enemy communications and control during the assault.

Air superiority was the principal prerequisite, and to assure this, air operations were begun in the preliminary phase, while on D-day concentrated attacks were made on German airfields. The German Air Force was more impotent than had been expected. The long-term strategic bombing plan had inflicted crippling blows on German supply, maintenance, and aircraft production. Parallel with the attacks on production centers was a day and night campaign against enemy airfields, and in the period between 15 November 1943 and 5 June 1944, the Allied Forces accounted for 5,238 destroyed, 1,060 probably destroyed, and 2,551 damaged enemy aircraft in air combat alone.

The strength of the AEAF on 1 April, 1944, was 2,909 aircraft in the Ninth Air Force, and 2,768 RAF.

The plan for attack on enemy communications was intended to force the enemy off the railways, and attacks by heavy and medium bombers on railway centers were maintained up to and after D-day. From D+7, they were supplemented by attacks designed to cut the lines and to halt or destroy such traffic as could still be moved. In these tasks, fighter-bombers played the major part. The principal targets were bridges, junctions, cross-overs and tunnels, as well as rolling stock and locomotives. By D-day, of the eighty targets allocated, fifty-one were so damaged that no further attacks were necessary. From 9 February to D-day, 21,949 aircraft operated against the eighty targets and dropped a total of 66,517 tons of bombs.

By D-day, the object of the rail plan had been realized. The Nazi-controlled transport system was badly disorganized. Immediately before D-day, special large-scale fighter sweeps against trains and locomotives in Northern France and Belgium were initiated and immense damage done. On 21 May, the AEAF claimed sixty-seven locomotives destroyed, ninety-one damaged and six stopped; and on the same day, the US Eighth Air Force claimed ninety-one locomotives destroyed and 134 damaged. With the railway system partly destroyed, enemy armies and supplies were forced on to the roads, which made them more vulnerable to air attack.

A further check to the enemy's flow of reinforcements was the destruction of bridges. The Dispatch describes bridges as difficult to hit and even more difficult to destroy completely. An average of 640 tons of bombs per bridge was found necessary. Later, when fighter bombers were used for this work, bridges were destroyed with 100 to 200 tons of bombs.

Air operations supporting the landing were essential to protect Allied shipping. Air operations were, therefore, directed against coastal defenses and radar cover. There were forty-nine coastal batteries capable of firing on shipping approaching the assault area. To avoid showing particular interest in the assault area, batteries were attacked as far north as Ostend in the proportion of two outside to one inside the area. By D-day, the majority of the coastal batteries within the area had been subjected to damaging attack.

Putting Out the Radar Chain

The enemy radar cover was complete from Norway to the Spanish border. The decision was made to destroy certain vital radars and jam others. Up to D-day, 1,668 sorties were flown by aircraft of AEAF in attacks on radar installations. The targets were heavily defended, and losses among experienced pilots were heavy.

Attacks were also made on navigational beam stations and special radio stations.

In the vital period between 0100 and 0400 hours on 6 June, when the assault armada was nearing the beaches, only nine enemy radar installations were in operation, and during the whole night the number of stations active in the "Neptune" area was only eighteen out of a normal ninety-two. No station between Le Havre and Barfleur was heard operating.

Further preparation for the landing was made by air attacks on military targets. Between 1 May and 5 June, 1,562 sorties were flown, 282 sixty-pound rocket projectiles fired, and 5,370 tons of bombs dropped on enemy fuel and ammunition dumps, military camps, headquarters and similar targets.

The task of dealing with enemy coastal shipping was undertaken by Coastal Command, which flew 4,340 sorties on the anti-shipping and anti-U-boat patrols in the Bay of Biscay, along the Dutch coast, and in the Channel between 1 April and 5 June. They made 103 attacks on shipping and twenty-two on U-boats. A sea-mining program was carried out by Bomber Command, which flew 990 sorties and laid 3,099 mines.

Direct attacks upon the enemy air force began on 11 May. Forty main operational airfields and fifty-nine bomber bases were selected for attack, and between 11 May and D-day, thirty-four of the most important were attacked by 3,915 aircraft dropping 6,717 tons of bombs. These attacks forced the enemy to operate a long way from the assault area.

Photographic reconnaissance played a vital part in the invasion, and the photo reconnaissance units were the first to begin active preparation. The coastline from Holland to the Spanish frontier was covered for beach obstacles, coastal defenses and batteries. Obliques were taken at wave-top height, three to four miles out from the coast, to provide a landing-craft view, and other obliques were flown 1,500 yards from the coast at zero feet to provide platoon assault commanders with recognition of landing points. Further obliques were taken at 1,500 yards from the shore but at 2,000 feet to provide views of the immediate hinterland. Inland strips were photographed behind the assault areas, as were bridges over rivers, prospective airfield sites, and all likely dropping areas for airborne divisions. Flooding areas throughout Holland, Belgium and France were photographed. In the two weeks before D-day, one RAF Mobile Photographic Section made more than 120,000 prints.

The urgent need for a medium/low altitude photographic reconnaissance aircraft was met by the conversion of Mustang fighters into tactical and strategical medium/low altitude photographic reconnaissance aircraft. The development of this aircraft for reconnaissance work is claimed to have been one of the outstanding lessons of the air war.

AEAF was directly charged with protecting the assembly of assault forces. Enormous forces were concentrated in the ports and harbors of the South Coast, Bristol Channel and Thames Estuary over a long period, and a series of exercises were staged. The Planning Staff had estimated that the German Air Force would have 850 aircraft available against the assault operation, but activity did not reach this maximum scale of effort.

Flying bombs and rockets became a potential menace, and part of the air effort was diverted to attacks on the sites of these weapons. Operations against the sites began on 5 December 1943, by which date sixty-three ski sites and five rocket sites had been identified. At D-day, eighty-six of ninety-seven identified flying-bomb sites, and two of seven rocket sites had been neutralized.

A summary of the air operations from 1 April to 5 June 1944 shows that 195,255 aircraft were dispatched, 195,380 tons of

bombs were dropped, 1,987 aircraft were lost in combat, and 2,655 enemy aircraft were destroyed in combat. In addition, Coastal Command made 5,384 sorties.

After postponing the assault for twenty-four hours because of bad weather, it was decided to make it on 6 June, and that the airborne forces were to be flown over and dropped before dawn of that day. There was no enemy opposition to the original passage of the assault or airborne forces.

Strength of aircraft available, RAF and US Forces, was:

Medium bombers	620
Light bombers	354
Fighters and fighter-bombers	3,483
Transport aircraft	1,628
Reconnaissance aircraft	336
Artillery observation aircraft	102
Air-Sea Rescue	96
Powered A/C total	6,619
Gliders	2,591
Grand total	9,210

Assistance to the Naval forces in the protection of the passage of the assault armies was undertaken by Coastal Command with patrols at either end of the Channel. Fifteen squadrons of fighters were detailed to protect the shipping lanes. Neutralizing the coastal defense positions during the crucial period of the assault was shared by naval and air bombardment.

Bomber Command began with attacks on ten selected heavy coastal batteries and dropped 5,853 tons of bombs. The US Eighth Air Force heavy bombers took over, and 1,365 heavy bombers attacked selected areas, dropping 2,796 tons of bombs. These operations neutralized almost all the shore batteries. Medium, light and fighter-bombers attacked artillery positions and other targets inland. US heavy bombers operated again later in the day.

The Fleet Air Arm was unable to provide aircraft for spotting gun fire of the capital ships, so two squadrons of Spitfires and two wings of Mustangs were trained for this task, and on D-day they flew 236 sorties. Between 6 June and 19 June, of the 1,318 sorties flown on naval gunnery spotting, aircraft of AEAF flew 940, and lost five aircraft.

Continuous daylight fighter cover was provided for the beachhead areas, and night fighters patrolled continuously during the hours of darkness. Balloon protection was provided for all beaches and artificial ports.

Air operations to dislocate enemy control began on the day before the assault. German corps and divisional headquarters, army telephone exchanges and similar targets were attacked by fighters with bombs and rocket projectiles.

Three divisions of parachute and glider-borne troops were landed, reinforced and supplied. Two of these divisions were the 101st and 82d U.S. Airborne Divisions, whose task was to capture the areas of St. Mere Eglise and St. Martin and the neighboring coastal defenses. The third unit was the 6th British Airborne Division, who were to take and hold two bridges over the Orne-Caen Canal and secure a base east of the Orne River.

The paratroops of the 101st Division were dropped by US aircraft in the area of St. Mere Eglise on the night of 5-6 June, and the glider force went in at dawn on D-day into the same area. A re-supply mission was flown on the night of D+1. Paratroops of the 82nd Division were flown in US aircraft and dropped in the area of St. Sauveur le Vicomte just before midnight on 5-6 June, and the gliders were flown in during the next two days.

Two RAF Transport Command Groups dropped troops, reconnaissance parties, task forces, base parties, paratroops and supplies. This was the greatest air lift of assault forces that had ever been attempted, and the casualty rate was remarkably low. All airborne forces and re-supply missions were given fighter cover.

The total air effort for the period—2100 hours, 5 June to 2100 hours, 7 June—was 25,275 sorties.

The Post Assault Phase

Dislocation of the enemy railway system continued, reinforcements were attacked, and after the breakthrough by the Allied Armies, the retreating forces were blocked and harried. By D+1, those of the enemy's immediate reserves which had escaped, joined the battle, and the Air Commander in Chief, therefore, decided to attack railway junctions in the tactical area and thus establish a line beyond which enemy movements by rail could not be made. Within three days, all railway and major road movements by day had been halted.

Fuel and ammunition dumps in the tactical area had been destroyed by aircraft of the AEAF, and by the second week of the battle the enemy was drawing supplies from the Marne area.

The boundary of the tactical area was extended on 12 June, and again during the third week in June, by which time the enemy was bringing reinforcements from Poland and Germany. Two *panzer* divisions had to detrain at Nancy and move 300 miles by road. Others detrained at Mulhouse. Attacks were made on Metz, Blainville, Strasbourg and Saarbrucken. During the period from 6 June to 31 July, 15,089 sorties were made and 34,429 tons of bombs dropped in attacks on rail centers, tunnels and embankments, apart from attacks by fighters and fighter-bombers on enemy rail movements. When the Allied Armies broke out from their bridgehead, all attacks on rail targets were called off as likely to hamper the advance.

Attacks on bridges were also stopped when the Allied advance began, but during the same period 16,308 sorties had been flown and 24,643 tons of bombs dropped on these targets. In spite of bad weather, the Allied Air Forces crippled one of the most complex networks of railways and roads in the world.

The use of heavy bombers in close support was an important development in air warfare, and was used because of the delay in breaking out of the Normandy bridgehead. The first large-scale attack was made at 0430 hours on 8 July, when 467 bombers dropped 2,562 tons of bombs on positions north of Caen. The British and Canadian troops followed up with a frontal attack, and by nightfall had entered the streets of Caen. The second attack was on 18 July when 1,676 heavy and 343 medium and light bombers dropped 7,700 US tons of bombs in support of an advance by elements of the Second British Army in the Caen area.

Four more attacks by heavy bombers were made. The Dispatch claims that these attacks definitely proved that saturation bombing by heavy bombers on a narrow front can enable an army to break through, but they also showed the need for the army to exploit without delay the favorable situation created.

The immediate support of the armies by fighter-bombers caused heavy enemy losses in men and equipment. The Dispatch points out that the chief value of the Tactical Air Force during the first period lay in their ability to smash up the enemy's attempted concentrations of tanks and vehicles before a counterattack could be launched.

The German Counteroffensive

On 7 August, the enemy attempted a large-scale counterattack giving the tactical squadrons of the AEAF a chance to inflict a crushing blow. Nineteen squadrons of Typhoons, operating from French airfields, carried out fifty-nine missions, flying 459 sorties in one day; 2,088 rocket projectiles were fired and eighty tons of bombs dropped, and the pilots claimed large losses.

As the Allied advance progressed towards the encirclement of the German Seventh Army, the ground position became confused, and, inevitably, our Air Forces

once or twice attacked our own troops in error. As a result, the army commanders fixed bomb lines, which restricted attacks in close support and denied to the fighter-bombers many excellent targets.

The enemy retreat to the Seine presented our air forces with some first-class targets and thousands of vehicles were destroyed. Attacks by strong bombing forces were used to reduce the enemy garrisons of the Atlantic and Channel ports. These attacks paved the way for the final assault, but the writer of the Dispatch says that this bombing effort would have been more profitably directed against targets inside Germany.

Fighter cover for the assault and shipping areas was provided by 171 squadrons of day fighters and fighter-bombers, and six squadrons of night fighters. Twenty-three squadrons were retained for air defense of the United Kingdom. Because of the lack of reaction by the German Air Force, this defense force was reduced. On D-day, 2,296 aircraft were available, and 4,216 sorties were flown. On D+1, there were 2,744 aircraft available and 6,255 sorties were flown, while during the rest of June the average number of aircraft available was 2,683 and 2,688 sorties were flown daily. The control of fighter forces was by Combined Control Center Uxbridge, with three Fighter Direction Tenders operating as forward controls.

The first British squadrons to land in France since 1940 were numbers 130 and 303, which put down at 1200 hours on D+4 on a strip on the "Gold" area, quickly followed by three squadrons of the Royal Canadian Air Force which, at 1637 the same day, were airborne for a sweep. Three weeks after D-day there were thirty-one Allied squadrons operating from beachhead airfields.

The strength of the German Air Force considered likely to be committed against the invasion was 1,750 front line aircraft, but, in fact, between D-day and 30 September no serious air battles took place.

Enemy air opposition throughout July was sporadic. The reaction to our bomber forces also varied. The reaction to night attacks, however, produced violent activity, and night offensive operations by the German Air Force against shipping targets were maintained.

During the second week in August, the German Air Force effort rose to about 400 sorties a day, but after two days declined steeply. The decline was due partly to our attacks, partly to the fact that they had been driven to move their units farther east, and partly to the shortage of fuel. By mid-August, new units began to appear, but although these units pushed up the daily effort to nearly 300 sorties, the fighting value continued to deteriorate. In September, fighter units staged a spirited revival of effort against strategical bombing, and about this time jet-propelled aircraft began to appear in operations.

The Flying Bomb Attacks

Responsibility for the defense against flying bombs was vested in the Air Defense of Great Britain whose long-prepared plans were put into operation when activity with these weapons began on a large scale on 15 June. Additional guns and balloons were deployed and the US Forces contributed antiaircraft guns and fighter patrols. Of the flying bombs destroyed between 12 June and 30 September, the fighter patrols accounted for 1,915; antiaircraft for 1,547; balloons for 278; and other causes 33. The total launched was 7,503. Large-scale bombing operations were also undertaken against the sites until our ground advance forced the enemy to abandon those in the Pas de Calais.

The landing of the First Allied Airborne Army in the Eindhoven—Nijmegen—Arnhem areas of Holland was designed to help the advances of the northern group of armies up to and over the Rivers Waal and Lower Rhine. The initial drops were successful, and during the next nine

days reinforcements and supplies were flown in. Air forces supported the operation by (1) attacking airfields and known flak positions; (2) by dive bombing flak positions developed by the enemy during the operations; (3) by providing top cover along the route of the airborne trains, and a screen east and north of the dropping areas; (4) by the provision of night fighter patrols; by diversions by Coastal Command; and (5) by arrangements for re-supply of airborne forces by heavy bombers. In all, the supporting air forces flew over 7,800 sorties in support of Operation "Market," and 114 aircraft were lost.

Coastal Command

Coastal Command was mainly responsible for dealing with enemy naval units trying to interfere with the landing and reinforcement. Coastal Command antisubmarine patrols operating from the Scilles to Ushant and from St. Alban's Head to Cap de la Hague, attacked six U-boats on the night of D-day, and seven more during the following twenty-four hours. During June, eighty sightings were made in the approaches to the assault area and forty-six were attacked. With the Allied advance in August, the U-boats moved to the southern part of the Bay of Biscay. Twenty-four sightings and fourteen attacks were made in the Bay in August. Six U-boats were probably sunk, and two damaged.

The British and US Strategical Air Forces continued operations against targets in Germany, and the main weight of their offensive from June to September was against oil supplies and production centers. Summarizing the air effort from D-day to 30 September, the Dispatch says that the aircraft of AEAF had flown 316,248 sorties, and the Strategical Air Forces based in the UK had flown 552,197 sorties, making a total average of 4,719 a day. Casualties were heavy: Killed in action or died of wounds, 4,560; missing and prisoners of war 29,078; wounded 4,665.

Fuel for the Armies

When the advance of the Allied Armies began to outrun normal supply services, a special force of heavy bombers was allocated to provide additional lift, and this enabled enough fuel to be taken forward to keep the armies moving. The Air Commander in Chief considers that the principal lesson learned from the campaign was that the tactical use of air transport to supply a rapidly advancing army could be of decisive importance, and that the limiting factor in its employment was not so much the availability of suitable aircraft as the availability of landing strips in the forward area and the reloading arrangements of the terminus. He considered that special landing strips should be constructed for transport aircraft to avoid interference with operational aircraft.

Conclusions

The Dispatch concludes with some reflections on the campaign:

Events thoroughly justified the strategic bombing policy.

Bridges can be destroyed, given suitable types of aircraft and weapons, although the cost may be heavy in personnel, aircraft and bombs.

Efforts to mislead the enemy proved effective, but placed a great strain on air resources.

Other services tend to expect too much of the air forces as to destruction of prepared gun emplacements.

The Fleet Air Arm was unable to accept the full responsibility of spotting for Naval bombardment, and, in the main, this task fell to the RAF.

Steps should be taken to hasten the production of an effective mechanical method of indicating friendly aircraft.

Balloon defense is profitable if there is any likelihood of low-level air attack.

The enemy air effort was mediocre

throughout, largely the result of previous attention paid to the German Air Force, his loss of radar cover, and attacks on his bases and installations.

The fighter-bomber proved to be a battle-winning weapon.

Heavy bombers can be employed in a tactical role.

Land forces should accept a bomb line as close as possible to the front line.

Armed reconnaissance of roads, rail lines and river crossings at night proved extremely effective.

Good photographic reconnaissance cannot be overemphasized. There should be one medium and one high-flying flight in each photographic reconnaissance unit.

Direction of air operations which call for the employment of air forces from various countries and commands should be placed in the hands of one airman to insure unity of command and planning.

The staffs of the Supreme Commander and of those of the air, naval and land commanders, if created, should be located very close together during both the planning and execution stages. This principle should be held to be inviolate, and to achieve it, the services must be prepared to make sacrifices.

Post-War Mine Clearance

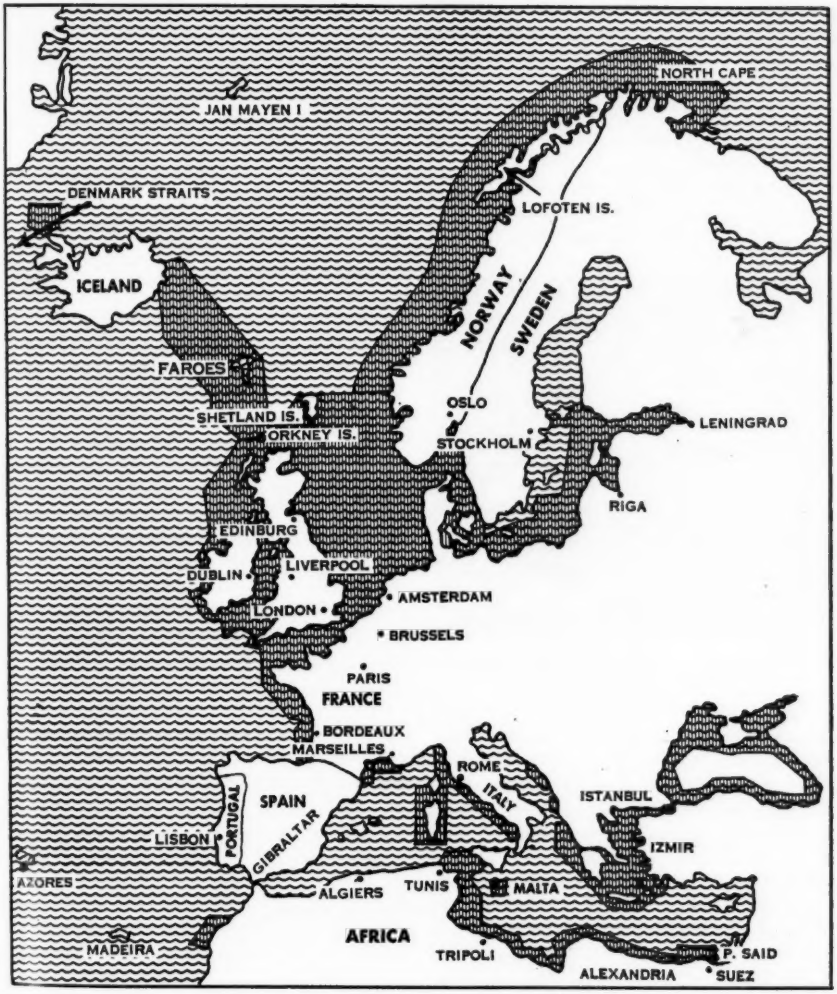
Digested by the MILITARY REVIEW from an article in "The Navy" (Great Britain) February 1947.

EVEN now, two years after Germany's surrender, the work of the minesweepers continues in the removal of what still remains of the huge conglomeration of allied and enemy mines that were laid in European waters during World War II.

The task that confronted the Allied Navies in May 1945, in making the seas safe for shipping was far heavier than that of 1918. Whereas during 1914-18 some 247,700 mines had been laid by Britain, neutrals and the Germans in European waters, including the White Sea, Baltic, Mediterranean, Adriatic, Aegean and Black Sea, something over 481,000 were laid in these same areas between 1939 and 1945. In the waters of northwestern Europe, excluding the Baltic, the Germans laid some 126,000 mines and more than 32,000 sweep obstructors, some 12,000 of the mines being dropped from aircraft. Though the number of German and Italian mines laid in the Mediterranean is not known with any certainty, the figure of 100,000 is probably an underestimate. In round figures the number of British mines laid in the waters of northwestern Europe and the Mediterranean was 255,000.

In the clearance after World War I, practically all of the minesweeping was against moored mines, laid from surface ships or submarines, which detonated only on contact with a vessel. The technique of sweeping was comparatively simple. In World War II there were still the moored contact mines, though far more potent than World War I mines and, in addition, the mines of the magnetic and acoustic varieties which could be laid by surface ships or submarines; and those dropped by parachute from aircraft.

The aircraft, of course, could mine waters such as inshore channels, rivers or dock basins to which no enemy ships could have access. The magnetic mines, as is well known, exploded on being actuated by the magnetism of a steel ship passing within a certain distance, and the acoustic mines by the beat or throb of a propeller. To add to the complication,



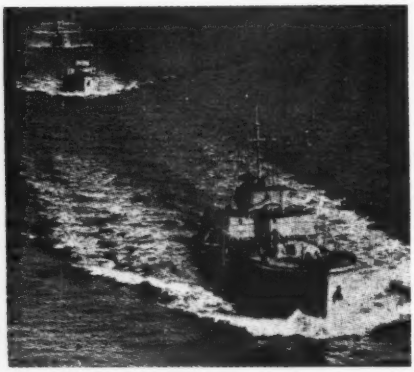
Areas dangerous to navigation, May 1945.

they might or might not be fitted with delay action devices.

When these new-fangled mines came to be laid by the Germans early in the war, we very soon discovered the antidotes. Their use, however, particularly from aircraft, greatly enlarged the areas that had to be swept and cleared regularly, while it necessitated the employment of various types of minesweepers. In general, the

"fleet minesweepers," dealt with the moored mines in the open sea. The "motor minesweepers" (MMS) and their American equivalents, the "yard minesweepers" (YMS when manned by Americans, and BYMS when British-manned), swept, some for the magnetic and others for the acoustic mines.

The MMS and BYMS, which were wooden ships to avoid magnetism, were used primarily for coastal work and in



The North Sea minesweeping fleet approaching Sheerness.

the approaches to harbors. Motor launches worked in shallow minefields, while trawlers and vessels of similar type were employed in searching sweeps, or in areas where shallow draught was not of primary importance, as well as for laying "dans," or buoys, to mark swept areas.

Much the same procedure goes on in the mine clearance of today and it can be understood how greatly the work has been prolonged, as it was during the war, by the difficulties encountered when sweeping minefields containing mixed moored and ground mines. Furthermore, nearly all minefields were protected by moored antisweeping devices, including static and explosive obstructors and empty mine cases moored with heavy chains. The ground mines, too, were fitted with delay mechanism which necessitated the resweeping of certain areas up to no fewer than fifteen times.

When the "International Central Board" for mine clearance was set up after the war, the whole of the mined area was divided into four main zones—East Atlantic; Mediterranean; Kattegat, Baltic Straits and their approaches; Barents Sea, Baltic and Black Sea.

Of a total of 1,173 minesweepers of all types available in September 1945, 797 were British; the corresponding figures for March 1946, being 1,597, with 319 British; and for September 1946, 1,900, with 214 British. We, the British, are not primarily concerned with the sweeping in the last zone, which has been the work of Russia, Sweden and Poland for the Baltic, Russia for the Barents Sea, and Russia and Turkey for the Black Sea. In the other zones, national forces operated in their own sub-areas of responsibility, of which Britain had the lion's share. British minesweepers also reinforced the Dutch and Belgian forces operating off the coasts of those two countries, and the Greek and Italian subareas in the Mediterranean. German minesweepers, of which some 400 were in operation by March 1946, worked under British orders and control.

As a point of general interest, a special and difficult problem was presented by the large number of British ground mines dropped by our aircraft in the Kattegat area towards the end of the war. They comprised more than 6,300 out of the total of nearly 9,900 mines laid, and their positions could not be pin-pointed. Swedish forces cleared their own waters, and British, Danish and German sweepers the area nearer Denmark; the general principle being to widen the old German swept channels to a breadth of two miles over the principal shipping routes before clearing the area as a whole.

The Kiel Canal, heavily mined, was at a complete standstill in May 1945. To deal with it a force of German minesweepers was formed under British command. Up till 30 March 1946, this force had detonated eighty-eight mines; but from January 1946 onwards, one million tons of shipping a month was already using the Canal.

However, the bulk of the British minesweeping during 1946 has been carried out much farther afield. Six flotillas of our fleet minesweepers, or seventy-two ships including their "danlayers," have been working from Reykjavik, in Iceland (two flotillas); Londonderry (two flotillas); Queenstown and Portsmouth (one flotilla each). They have been employed on the minefields in the Denmark Straits, northeast of Iceland, and the other fields between Iceland, the Faroes and Scotland; on further minefields north and south of Ireland and off the west coast of Scotland; as well as on the deep or other minefields in the English Channel, off the Firth of Forth, the Straits of Dover, the southern part of the North Sea, and German minefields off the Norwegian coast.

Thirteen flotillas of MMS and BYMS, comprising well over a hundred little ships, have been based upon Lowestoft, Harwich, Sheerness and Dover. Their task has been to complete the dangerous sweeping for ground mines on the east coast of England and in the English Channel, work which was successfully accomplished by the end of September 1946 with the exception of pressure mines off the east coast of England and the north coast of France. Minesweeping of any sort is practically impossible in bad weather, and most of the British sweeping has been done in open water.

Of the 6,275 mines swept in the East Atlantic zone between 15 August 1945, and 30 September 1945, 5,494 were swept by British minesweepers. Considering the evil weather in winter, and the gales in summer, this record is a great tribute to the work of our minesweepers.

Two flotillas of fleet minesweepers, some twenty-five ships including their nine "danlayers," together with two flotillas of BYMS have been used in the Mediterranean. Something like 34,000 square miles of sea have been cleared, including the sweeping of minefields off Malta and Pantellaria, and the extensive British, German and Italian fields laid in the Sicilian Channel during the war.

The BYMS based at Trieste, have cleared the thickly laid minefields off that port—first by sweeping for moored mines, and then by sweeping for ground mines. The British minesweepers in the Mediterranean have also done a magnificent job in clearing great areas of sea for peaceful shipping.

Since the end of the war in Europe up till the end of September 1946, some 135 ships, including merchant vessels, fishing craft and other miscellaneous vessels were sunk or damaged by mines in all the European mined areas. Of this total more than 100 became casualties through faulty navigation, disobedience of routing instructions, or fishing in prohibited waters. How many more ships, big and little, safely used the traffic lanes or fished in the areas swept and declared open since the war is not known.

Sweeping for moored mines in the waters of Northwestern Europe, including the Baltic, will be completed in 1947. The final elimination of ground mines will continue until the end of 1948, after which they will have become harmless. In the Mediterranean, the whole of the mine clearance cannot be completed before 1949.

French Military Justice

Translated and digested by the MILITARY REVIEW from an article by Andre Sauvageot in "Revue de Défense Nationale" (France) February 1947.

AT the conclusion of a war, technicians and specialists take an inventory of new weapons and methods. It seems opportune at such times, also to examine the manner in which the services function. We propose to examine briefly, in the light of recent events, whether military justice does not seem to be changing from its original purpose.

Actually, military justice is not a product of war periods. Although during war it expands to embrace a larger number of individuals, its operation in time of peace gives rise to serious problems. Being a special form of justice, it suffers from unfavorable prejudice on the part of political parties given to liberal and humanitarian ideas. Being a speedy and often rigorous form of justice, it finds, on the other hand, a certain degree of support among those who base their concept of the state on the principle of strongly constituted authority. Our parliaments have often resounded with bitter arguments concerning these matters, and public opinion, itself, closely followed the great reform of 1928, which substituted military courts presided over by civil magistrates for the former war-councils. It would be erroneous to regard this as only a simple change in procedure. It would, on the other hand, be going too far to hail it as a sort of triumph definitely establishing the supremacy of civil over military authority.

It does not seem at present that military justice is in danger, as has sometimes been the case, of any doctrinal opposition. As a matter of fact, the desire is more frequently manifested of confiding to experts the task of settling conflicts or differences which, by their very nature, appear related to some particular profession. An example is the agricultural courts dealing with matters of farming, which is composed of a professional magistrate, a land-owner and an agriculturalist. Of these special judicial organizations, the military court may be regarded as the ancestor.

Military justice seems to be unavoidable because of a special category of infractions which are irreconcilable with the notions of common criminal law. The military crime is, in the final analysis, the violation of a duty peculiar to an individual serving under the colors, and it defies transfer to civil life. Such matters as insubordination, abandonment of post, sleeping while on duty, and capitulation in the field, are crimes which never find their way into civil society as long as it remains loyal to democratic and liberal traditions. The penal code of the Third Reich, applicable even to civilians, had, little by little, become imbued with these dictatorial concepts. It should be remembered, however, that the German mind had, at the same time, become powerfully militarized. The code was the image of the nation itself.

It should, moreover, be observed that the individuals who formerly proclaimed utter defiance of military jurisdiction would hate today to confess an antimilitaristic attitude. The necessity for preserving the safety of the nation, by the most rigorous means if need be, has been a battle-won revelation.

It must be noted that the increasingly frequent recourse to military jurisdiction is far from being a specifically French peculiarity. It is becoming an established practice from the international standpoint, as indicated by the famous trials of persons accused of complicity with the enemy in the various liberated countries of Europe, and the Nürnberg International

Military Court for the trial of war criminals. When it happens that military competence is set aside, it is under the influence of exceptional considerations. Thus, when Germany took action to punish the generals suspected of plotting against Hitler, on 20 July 1944, it was first decided that these officers should be declared unworthy, from the military point of view, before being deferred to a "people's court."

A rapid examination reveals modern French military justice as a special instrument offering the accused very important guarantees.

As opposed to the ordinary legal institution, military justice reveals itself as a solidly organized unit. It would be a grave error, however, to imagine it a monolithic structure. Few institutions are more flexible. That is to say, very marked specialization is traditional here.

The different arms long since acquired complete autonomy of justice. As regards this peculiar situation, *esprit de corps* though profoundly rooted in military environment, would be an inadequate explanation. Due to their diverse origins, technical training, administrative organization, and daily life, the elements of the army acquire characteristics which accentuate their differences. There is no crime down to the simplest in appearance (desertion), that should not be estimated differently, depending on whether it has been committed by a soldier confined to the monotonous life of the garrison or by a sailor back from a long cruise.

We must, therefore, have courts for soldiers, others for sailors, and still others for aviators. This necessity for differentiation has compelled recognition, with such insistence, that it has survived all the vicissitudes that have befallen the administrative department of the Army. We might have supposed that the three-way division of military jurisdiction was linked with the traditional separation of the three military departments into ground, naval, and air forces, and that it would cease when, under the pressure of circumstances, military authority was unified under the superior direction of a minister of national defense or a minister of armed forces. Nothing of the sort has occurred, however, and this fact should immediately prove that solid reasons impel this specialization. But another proof still more to the point is to be had: not only do the three arms require special jurisdictions, but they have obtained special codes. The military code of justice for the ground forces is the ancestor of the texts of military law. It does not possess the venerable appearance of the Napoleonic compilations, but, on the other hand, it appears more easily adaptable to the requirements of evolution. As it stands now, by virtue of the law of 9 March 1928, it presents the appearance of a technical instrument that may be easily perfected. The code of military justice for the Navy was completely revised by the law of 13 January 1938. This shows how modern its inspiration is. Aviation, the youngest of our arms, has not yet acquired sufficient independence from the juridical point of view. It still is obliged to borrow its code from the Ground Forces, as well as its jurisdictions, modified by the addition of a certain element proper to the air forces. There is no question but that this inadequacy is temporary, and that in the near future the Air Force will demand and obtain a code of its own.

Perhaps soon it will be necessary to renounce, at least partially, the present specialization and create a single national inter-arm court. For this new jurisdiction, to which civilians as will as the military would be subject, the penal code would be an inadequate weapon.

The present specialized military justice should include penal institutions. There do exist a few army and naval prisons. But their small number and geographical dispersion frequently make it necessary

to incarcerate soldiers in civil jails. We find here the first connection between the civil and the military systems.

Another contact is the liberal manner in which military justice, in time of war, accepts magistrates, lawyers, and others of the legal profession. In time of peace, however, military justice manifests its independence by a special corps of magistrates. The principal difficulty in this matter is in reconciling the hierarchical organization of the military with necessary independence, without which all efforts toward justice would be in vain. This double and somewhat contradictory aspect of the military judge explains to a large extent the grave difficulties encountered in recruiting this special corps. Added to this is the small degree of enthusiasm shown by officers who have already reached a certain rank (ordinarily that of captain, and necessarily, holders of juridical diplomas) for engaging in a career which does not enjoy among the military profession any great amount of prestige, and which will absolutely bar access to the higher grades of the service.

The functions devolving on officers engaged in military courts are not permanent. Appointed by the general in command of the particular area, these magistrates "may be replaced every six months."

Military jurisdiction, in contrast with civil justice, is found to be strongly hierarchical. While in common law, justice is equal for all, in military law the *intuitus personae* plays a considerable role. The quality and rank of the accused determines the composition of the court called to try him. The judge of lowest rank must be equal to that of the accused. This trial by equals (or by superiors) is meticulously provided for by the military code, whose concern has been extended even to the establishment (not without difficulties) of a court composed of the most illustrious personages, for trying marshals of France.

A large court, from the point of view of numbers, is always more impartial, and the military court, with its seven members, offers more guarantees than the repressive courts of common law with a single judge.

Military justice enjoys a reputation of solidly established severity. This renown comes from the rigorous conception which officers have of their judiciary functions. Living in a society based on a hierarchical concept and the necessity of discipline, they tend easily to a degree of severity that the professional magistrate often avoids.

A civil jury, composed of untrained persons, is in danger of excessive leniency. A court of officers, on the contrary, tends to be more severe. Let an individual become guilty of the most severely punished crime of a civil nature, and he will be subject to trial in the Assize Court whose frequent and sometimes inexplicable leniency is well known. On the other hand, let him commit a serious offense in time of war, and the defendent will be subject to trial in the military court which, in the anguish of a difficult moment, represents military justice in its severest aspects.

Add to this certain secondary aspects. For instance, the law presumes poverty in favor of the soldier, and the effects of this are sometimes unexpected. Sentenced to a fine, the soldier finds himself considered by law as unable to pay and special provision has been made in the verdict to substitute imprisonment of from two to six months for the penalty. We had to wait until 1935 to see this substitution, formerly obligatory, given an optional character. Also: "in time of peace as in time of war, persons condemned to death by military courts, are shot," while, by virtue of Article 12 of the Penal Code, "every person condemned to death will be decapitated." (Decapitation has been replaced since 1944 by shooting in the case of sentences by the Courts of Justice.)

But above all, military justice is rapid.

This characteristic best contributes to the exemplary value of the sentence imposed. The formalities of procedure are reduced and there is the noteworthy feature that the judiciary process of double degree does not exist. As soon as imposed, the sentence may immediately be executed.

This does not mean that military trial does not offer the defendant sound guarantees. In the majority of cases, a previous examination in charge of special examining officers gives the accused an opportunity to employ means of defense that a counsel will freely make use of in the presence of the court. Moreover, although the military court evaluates with sovereign authority the facts brought before it and the penalties called for by them, its decision is strictly subordinated to respect for the law. Assurance of this will be given by the possibility of an appeal*. This procedure, inspired by the desire for speedy and local justice, is subject, from the point of view of law, to grave difficulties, for it is manifestly inconceivable that the task of guaranteeing uniformity of jurisprudence should be confined to several different jurisdictions.

Under the influence of individuals of indifferent military inclinations, the rules of military law tend to approach those of common law but, in time of war, they diverge strongly from them, displaying their own individuality at such times much more definitely.

New proof of this was provided by the war of 1939. During the winter of 1939-1940, the structure of military justice remained unchanged. But when, under the shock of battle, the entire army was obliged to stiffen its attitude, military justice participated to a very notable degree in this necessary effort. A decree of 15 May 1940 stipulated that decisions relative to pillage may have no remedy or appeal. The same was decreed for all crimes tending to disturb the state by means of civil war, the illegal use of armed force, public devastation and pillage. Also a decree of 20 May 1940, provides for the transformation of military courts into courts-martial. These higher courts are characterized by three special features: there exists no delay between summons and appearances; the prosecutor (at courts-martial) must sustain the accusation; and the appointment to office of a counsel for the defense may be provided for.

These measures were put into force during the most intense period of the battle of France to insure the rigorous repression of infractions which threatened the life of the country. Events occurred so rapidly that it was not possible to measure the effectiveness of military justice. The hopes that the government placed in it, however, were by no means negligible.

It would be a capital error to believe that this reinforcement of military justice in the summer of 1940 resulted only from ephemeral efforts and that it was due to the fluctuations of battle. Rather, it is only one episode, in the considerable present expansion of military justice, at the expense of the courts of common law. Tracing this recent evolution, we become more aware of the essential need on which modern military justice is based and obtain an idea of the broad perspectives now open to its development.

The Republic had neglected to provide for its legal defense. The rare dispositions of the Napoleonic Code guaranteeing the repression of crimes against the internal security of the State, had long since fallen into disuse. France also neglected to defend herself against espionage. One of the most recent codifications in this matter, the law of 26 January 1934, was still imbued with indulgence and liberalism. Traditional in our country, these qualities were highly imprudent when a dictator had come to power at our frontier whose sole ambition was to realize his im-

* There exist, in time of war, several Military Supreme Courts of Appeal.

perialistic ambitions by any means. Therefore, it was decided 30 October 1935, that infractions "committed in the interest of espionage" would thenceforth be deferred to military courts. This exceptional competence was generalized, by an order in council of 17 June 1938, which extended it to all crimes of espionage, as well as to crimes against the external security of the State. Most important was the fact that thenceforth, the death sentence was applicable in cases of espionage. In secret warfare, as in public warfare, that side suffers which permits superiority of armament to become established to its disadvantage. In the judicial repression of espionage, French legislation was largely antiquated. A German law of 1 March 1933 and an Italian decree of 28 September 1934 punished crimes against the nation by death. In Poland, Czechoslovakia, Rumania, and Soviet Russia, the laws also provide for capital punishment.

Lastly, an order in council of 29 July 1939, established the distinction between espionage and treason and instituted a new sort of infraction called, unfortunately, as a result of prevailing conditions, "attempts against the external security of the State." This on the eve of hostilities, military jurisdiction encompassed large sectors which had theretofore been reserved for courts of common law.

A similar condition was again manifested just after the liberation and a rather wide-spread opinion, in comformity, however, with the traditions of the Republic, impelled the cognizance and repression of acts of collaboration to be reserved for the military courts alone. But the liquidation, on 27 November 1942, under pressure of the enemy, of the last formations of the armistice army, the manifest insufficiency of qualified personnel and, above all, the necessity for assigning all available personnel to the accomplishment of the first tasks in the campaign, prevented this task of purging the nation from being confined to military justice. That is why it was necessary to improvise courts of justice. But the competence of these temporary jurisdictions disappeared with time, and this effacement occurred to the advantage of military justice. It is, in fact, to military courts alone, that the cognizance of matters of "collaboration" must be confined.

It is on the military courts also that the cognizance of war crimes falls. Under this ruling, only the officers, non-commissioned officers and men who have belonged to the French Forces of the Interior or Resistance organizations, may enter the courts as military judges. The intent of this ruling was that the repression of German atrocities should be the work of the same men who had ignored all threats and braved all dangers to throw off the yoke of the enemy.

Such developments in the field of competence are not the result of chance. Modern war has become total war. All participate in it in some way or other. In this system, mobilization is not only military, but also industrial, economic, and above all, scientific. The dangers of espionage are multiplied. Around the atomic bomb and its secret, a vigilant guard does not suffice. There is required a juridical technique adapted to the new aspect of war and its preparation. Everything appears to justify our fears that, in the future, conflicts will no longer begin with the solemn, but unused, diplomatic declaration, and war may easily see its military phase preceded by a major civil preface. Already the installation of personnel in observation posts for purposes of intelligence, the previous assignment to their places of a vast personnel trained as a "fifth column," have been characteristic of the war that has just come to a close. In the future, the main task of the enemy agents will be to prepare the terrain and organize the invasion by disorganizing the rear areas and attacking the morale of the popula-

tions. It would be absurd and dangerous not to turn them over to military jurisdiction on the pretext that they have got rid of their uniform in the accomplishment of their task, which is military in nature.

The repression of acts of collaboration with the enemy and war crimes; rigorous punishment of espionage and attempts against the external security of the State; war against the activities of the "fifth column:" these are now the new objectives of military justice.

Times have changed. In the future, it will no longer be the quality of the accused but the nature of the infraction that will justify the competence of military jurisdiction. The clearly delineated trend of modern law is toward the assignment of a major role to military justice since in future it will be to it, and to it alone, that the most serious offenses jeopardizing the existence of the State will be referred. The evolution has proved itself a highly significant victory of military over civil authority. Will military justice show itself worthy of this future, charged as it is with crushing responsibility?

We have no reason for doubting it. Moreover, it has been less the institution than the men who have been criticized in this field. Frequently, the members of the corps of military justice have been accused of being unequal to the task, of preferring the quiet life to the dangers of war and life in the trenches. The necessity of possessing a judicial diploma, for professional training in a special corps, suffices to refute the first charge. As for the second, modern war no longer differentiates between the fighting forces and those in the services, as far as safety of person goes.

Also, there have been doubts as to the independence of the military judge. It is a fact that there exists no true justice unless those charged with rendering it are keenly zealous in the maintenance of their independence and impartiality. But nothing authorizes us to charge the military judge with the lack of the essential quality. Whether he be in uniform or wear the robe, from the moment he enters the court room to perform a work of justice the magistrate should be freed from all external contingencies and recognize nothing but the sanctity of right and equity. Nothing gives us the right to suspect that the military judge lacks these qualities.

Proud of its independence, military justice will no longer permit itself, whether from custom or fear of responsibilities, to be limited to the punishment of crimes committed by soldiers alone. Recent evolution, at least, gives us grounds for thinking this, just as everything leads us to believe that military justice will cease to be merely that disciplinary echelon above the quarters adjutant. On the contrary, it must assume consciousness of a new mission, which, in the France of tomorrow, will properly pertain to it. It is the duty and task, in peace and war, to insure the safety of the nation by the protection of those things that are vital to it. On these grounds, it is called on to make the most indispensable and precious of contributions to the permanent work of national defense.

Military discipline, a state of the soul and mind, is a conviction, a moral patrimony acquired by education, ... consciously assimilated and made an integral part of the soldier. It is an ennobling influence.

Lieutenant Colonel Correia Lima, Nação Armada

Artillery-Infantry Liaison

Translated and digested by the MILITARY REVIEW from an article by Captain P. Mennet in "Revue Militaire Suisse" (Switzerland) February 1947.

THE Swiss shall never need to make a comparison between the gigantic concentrations of artillery that the belligerent armies were able to create during the last war and the tasks which may fall to the lot of our artillery if we are called on to fight. One would have had to observe the destruction of Warsaw, the sieges of Stalingrad and Odessa, or the preparations which preceded the fall of Berlin, to have a real idea of the artillery power which a great nation is now able to place at the disposal of its soldiers.

Let us limit ourselves, therefore, to the supposition that our own artillery, like that of other nations, has undergone the same technical and tactical development, but on a reduced scale.

Artillery will always be the supporting arm of the infantry, a way to lighten the task of the rifleman. Intelligently employed, it will permit the rifleman to reach his objective in a minimum of time and with minimum losses. It will constitute a frontal cover, make possible his forward bounds, or protect his flanks. It will permit his to reorganize, and in case of necessity, to retreat.

Therefore, it is of utmost importance that artillery and infantry understand one another perfectly.

As regards the infantryman, the requirements are simple: to have the artillery fire at the proper time, in perfect synchronization with the maneuver as planned.

These requirements demand of the infantryman: (1) Permanent contact with artillery; and (2) Thorough understanding of the possibilities of the artillery, especially, its means of displacement and liaison; the time required for preparation and execution of a mission; its ranges and the breadth and depth of its effective field of fire; the effectiveness of its projectiles and the quantities at its disposal.

This information, which is easy to acquire, will permit use of artillery support as easily as heavy infantry weapons. The artillery completes these weapons.

As regards the artilleryman, the requirements demand more. Though the artilleryman may possess a perfect understanding of his technical task, he has generally not been sufficiently instructed in the tasks peculiar to the infantry, and it is a real effort for him to "think tactics."

For the artilleryman, the preparation and execution of a given barrage are fairly similar to those of any other barrage. In the infantry, an attack, running fight, or breaking of contact never resemble any other. The artilleryman is not directly in contact with the enemy, but the infantryman is. The artilleryman is able to make use of certain fixed plans, the infantryman, never. All the tasks of the infantry, regardless of echelon, depend on the situation of the moment, on the position, intentions, and the strength of the enemy.

To these numerous tactical problems, the artilleryman should give his attention. He should cultivate an interest in them and seek to solve them himself along with the infantryman. He should know the exact position of the troops that are engaged and their armament. He must rapidly gain a clear picture of the general situation, then turn his attention to all the details. He himself should work out an appropriate plan of maneuver.

The means at the disposal of the artilleryman for acquiring this instruction are varied: study of infantry regulations and various dealings with actual operations on the fields of battle; attendance at courses and lectures; and active participation in

the discussions with friends in the infantry.

The infantryman must be a man with a trained, wide-awake, audacious yet prudent mind, as well as a man who is crafty in his decisions, for on these things depend not only the success of his mission but also the lives of his men. By contact, with him the artilleryman will also absorb these qualities.

The moment the latter understands his role in his collaboration with the infantry, his task will lose all vagueness. He can take his place alongside the infantryman, give a tactical opinion and discuss the decision that should be made.

Understanding the infantryman, the artilleryman will quite naturally come to designate his targets himself. It is his role. He will no longer have to ask the infantry to indicate them, and will be able very rapidly to establish a plan of fire. The rare demands for information he will make of the infantry will be only a simple complement to preparations that have already been made.

Informed in this manner, the artilleryman will instantly know with what precision he must prepare for and open given fire. He will rapidly locate points of terrain from which the enemy might emerge, edges of woods and important heights.

In defense, the artilleryman must know whether fire is to be laid down on order of the infantry or whether it is permissible for artillery to go into action on the appearance of the enemy. Liberty to fire at its own discretion often cannot be given to the artillery.

The Liaison Group

These general considerations naturally lead up to the question of the qualities that a liaison officer, detached to the infantry, must possess.

Command over the artillery fire is usually in the hands of the commander of the battalion, but may be given sometimes to the commanders of batteries if they are assigned to different sections of the terrain. This means that during action the command post of the battery becomes a station for the transmission of orders and an observation post for the fire of the battalion. The presence of all battery commanders is not absolutely necessary in their command posts, and one of them may well be called upon to function as a liaison officer. I mention this, because it is very important to confide the liaison mission to an officer with maximum experience and a good understanding of tactics. The liaison officer always represents the superior artillery agent, which may be a battalion, a regiment, or a still higher formation.

The liaison group must be assigned to the infantry at the very beginning of the war. If its services are not called on immediately, either because the echelon to which it has been assigned is not yet engaged, or because it has not received its mission, the liaison officer will take advantage of his leisure time to establish and test his communications. He will also become acquainted with his friends, the infantrymen. It is indispensable that he feel at ease with this arm and become well acquainted with the commanders he will work with in battle.

Details of the Mission

When orders to move are received by his unit, the liaison officer remains with the commander of the infantry to which he has been assigned. He will tactfully assert himself and insist on being present at all conferences. It is necessary that he have a clear idea of the impending action and his observations can even influence the decisions of the infantry.

The liaison officer always represents the superior artillery agent. This means that only one liaison officer should be assigned to the infantry in order to avoid all confusion. The desires of the infantry relative to any or all calibers assigned to the sector will be granted.

It is necessary that the artilleryman keep the superior echelon continually informed. The latter, knowing only the general lines the action is to follow, must base its decisions on the details received from its representative at the front. No detail can be neglected. The most important is to indicate to the superior commander the exact location of advanced elements, to keep him posted concerning all movements of friendly troops, and possibly on enemy movements. These successive and frequent reports must be very clear.

Requests for fire should, if possible, be made on the basis of the fire plan. But in addition to this, one must accustom himself to the rapid designation of unexpected targets. The latter generally fall within the province of the heavy weapons of the infantry, but may occasionally be referred to the artillery.

The liaison officer must be accompanied by fairly numerous assistants. He will be assigned a good noncommissioned officer who is capable of handling signal communications. It is possible, for example, that the liaison officer may be called on to direct fire. In this case, his substitute (corporal or sergeant) will remain with the commander of the battery or regiment to maintain liaison and handle the transmission of information. It is indispensable that the noncommissioned officer have received prior instruction and training, and that he be capable of replacing the liaison officer, not only for maintenance of these missions but also for possible reconnaissance.

Great care must be taken in selecting the liaison group. It must be mobile and large enough to transport its equipment easily. The radio equipment, added to the reduced pack the men must carry with them, is still too heavy. Often called upon to follow the infantry command over unbeaten paths, the liaison group is seldom able to use any means of transportation. Hence, the more mobile the unit is, the more rapid the liaison will be.

Finally, there is the matter of signal communications. In many cases, the necessity for laying down a telephone line is questionable. Radio now leads over any other means of contact. The liaison detachment will, therefore, be equipped, as a rule, with radio only. A telephone group may be added if there appears to be likelihood of a prolonged stay in a very limited sector (a frequent situation, especially in the mountains). In this case, radio contact may be advantageously doubled by wire lines.

It seems paradoxical that war, which is becoming more and more terribly destructive of life, should be the cause of extraordinary medical progress in the direction of the preservation of life. Yet is true that wars always impress on the methods and teachings of medicine, as applied to armies in the field, an accelerated tempo of development that would require long years in the slow routing of peacetime.

Colonel Emanuel Marques Porto in "*Nação Armada*," (Brazil)

Katymines

Translated and digested by the MILITARY REVIEW from an article by Captain Lepotier, French Navy, in "La Revue Maritime" (France) February 1947.

REDUCED to submarine warfare during the last years of their occupation of France, the Germans laid down vast numbers of mines along the coasts.

In addition to the mine fields anchored off the coasts to interfere with Allied shipping, the Germans also sowed the approaches to the "Atlantic Wall" with mines. This network covered both the land approaches, the areas alternately covered and uncovered by the tides, and, lastly, the deeper areas which are never uncovered even by the lowest tides.

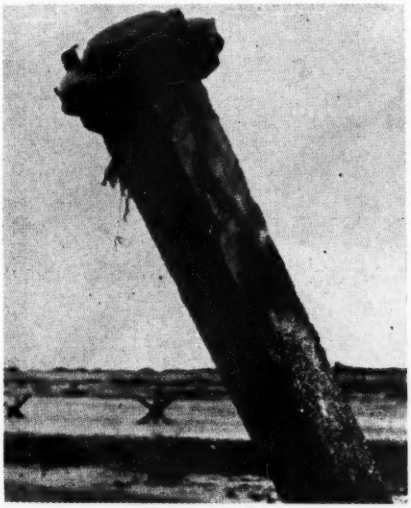
In the first two zones, the Germans used mines of the land type, exploding by pressure or a concealed wire. In the dunes, the mines were buried in the sand. One of the most typical scenes along those beaches which are uncovered at low tide was a row of stakes inclined seaward and crowned with a flat cement surface bearing a mine imbedded in pitch. These mine-decked posts alternated with "hedgehogs" of heavy angle-iron and other obstacles. Further out, but invisible, were the katymines.

The name "Katymines," given by the English to these devices, comes from the German abbreviation, KMA (*Küstenmine Mersten, Typ A*). They are intended especially for the destruction of flat-bottom landing boats at all tide stages. For this purpose, the mines are laid on the sea bottom near the coast where their upper portion remains a few inches below the surface of the water at lowest tide.

These mines are essentially an anchor-block and a tripod, on which is mounted an antenna equipped with a floating detonating line.

The anchor-block is of concrete with three hollow spaces inside it. The center space contains a charge of seventy kilograms of explosive; the two others, which are smaller, serve to reduce the overall weight of the block.

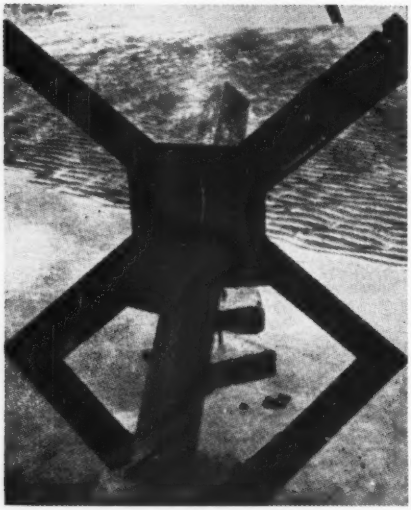
The upright portions of the tripod are iron rods, 20-mm in diameter, attached to the concrete block. The top of the tripod carries the antenna unit. A steel tube con-



A mined post.

tains two conducting wires which connect the antenna battery with the detonating unit sunk in the explosive charge. As in the other German mines operating by impact, the lead antenna contains a glass bulb of bichromate of potassium. When this is broken, electrical current ignites a fuze, thus setting off the primer charge. The bulb can also be broken by a lever to which is attached a floating line. When there is enough water above the antenna for a landing boat to pass over without touching, it still is in danger of fouling the floating line.

The Americans first learned the secret of the construction of this mine, and it was not until several months after the liberation that persons on the coast noted the tripods which began to show at the lowest tides. The English found the KMA plans in Germany relative to the French coasts and communicated them to us at the end of 1945. The coasts of the English Channel between the mouth of the Authie and Deauville were bordered by an almost unbroken belt of these devices, thirty



A "Hedgehog."

strings of them each containing from 40 to 150 mines. Many others were reported elsewhere, with a total of 6,128 katymines for the west coast of France.

As soon as this situation was known, search and demolition crews were organized.

The main difficulty encountered has been to discover the katymines, because the floating detonating lines have long since disappeared, the concrete anchor-blocks buried in the sand, and the tripods "camouflaged" by mud, shells, and seaweed.

First, location of the mines by observation and aerial photography was tried. Even in the clearest water this reconnaissance was fruitless except for tripods which emerged from the water at the lowest tide stages due to errors in placeing the mines.

Observation from the surface of the water was considered, but in the English Channel, even this method was not practical.

Removal of the mines by diver proved possible, but it was found that only 1,000 square meters could be explored in an hour by one diver, and it became evident that a faster means of exploration would have to be found.

Consequently, a quicker system was devised by which the mines were located by dragging the sea with a chain attached to two tug boats. The best results were obtained by using two steel draglines, 240 meters long, which left the chain a safe distance away in case it caused the explosion of a mine. These draglines are kept apart, in spite of the pull of the chain, by means of drag-floats, each having a twenty-five meter length of chain attached to their ends which terminate in an eighty kilogram iron weight. The "active" part of the chain, sixty-six meters long, is attached to swivels in front of the weights.

This drag, first tested on 20 July 1946, raised the hourly exploration rate of 1,000 square meters for the diver method, to 20,000 square meters.

During the 1946 operations, the KMA platoon destroyed three mine fields off Trouville. The positions given by the Germans were inaccurate, and wrecked ships in the area were also encountered. In view of the fact that twenty-six fields remain to be destroyed, it has been decided to organize three KMA platoons to complete the work.

In the Bay of Douarnenez, better visi-

bility permits a different method. Use is made of an LCVP and two flat-bottomed boats. Two men provided with water-telescopes search the bottom and discover the katymines. The flat bottom boats which follow mark them with buoys. The most difficult task consists of lowering an explosive charge and placing it on the estimated position of the detonating charge. The electric cable for setting off the charge is then reeled off to a length of 300 meters before the circuit is closed. If the mine is buried too deeply, the first explosion produces only a crater which uncovers it, and a second charge is required.

In the Mediterranean, off La Carnet, katymines were discovered at depths of from five to ten meters, 800 meters off shore. They were badly covered with sand. The demining crew first tried to lift the entire mine out by pulling on the tripod, but this proved dangerous and ineffectual owing to the depth to which they were covered by the sand. It became necessary to resort to demolition by successive charges of explosives.

Long effort will be required to terminate this difficult task of demining. With the passage of time, however, katymines die of their own accord. Rust attacks the framework of the tripods, the charges sink deeper and deeper into the sand, and the ocean does much to render them harmless.

Our D-day experience was to convince us that carefully laid plans of the German High Command to oppose OVERLORD with an efficient air force in great strength were completely frustrated by the strategic bombing operations. Without the overwhelming mastery of the air which we attained by that time our assault against the Continent would have been a most hazardous, if not impossible, undertaking.

General of the Army Dwight D. Eisenhower

Military Strength in China

Digested by the MILITARY REVIEW from an article by Michael Lindsay in "Far East Survey" April 1947.

DEVELOPMENTS of recent months in the Chinese civil war indicate shifts in the relative strength of the opposing parties. At first the Kuomintang had great superiority. By VJ-day twenty Kuomintang divisions had received American equipment and training, and during the period of American intervention the number of Kuomintang troops with American equipment and some American training was increased to over 700,000. The Communists south of the Great Wall managed to capture a certain amount of Japanese equipment after the surrender, mostly from puppet armies, but probably only a small part of their army reached the standard of equipment of Kuomintang divisions which had not received American supplies. It was only in Manchuria that large quantities of Japanese equipment were taken over and even there the amount may not have been much more than was necessary to equip the Communist forces in Manchuria.

Position Similar to 1938

The position was similar to that which the Communists faced against the Japanese in 1938. A much better equipped enemy held most of the railways while the Communists held most of the countryside. The situation was rather more favorable to the Communists: their areas and their army were much larger than in 1938, and the Kuomintang has not had complete control of the North China railway network as the Japanese had after the middle of 1938. Also the Kuomintang army was never as serious an opponent as the Japanese army. Only a few of the best American trained divisions had been able to meet the Japanese on equal terms.

It seemed likely, however, that the course of the civil war would be similar to the course of the war against the Japanese. So long as the American trained Kuomintang armies held together and the Communist army remained short of equipment, the Kuomintang would be able to capture any positions they wanted to, provided they were prepared to pay the price. In the fighting before the truce agreement of January 1946, the Kuomintang suffered some serious local defeats when they advanced too rapidly to positions where the Communists could cut their communications. They seemed to be successful in taking their main objectives, however, gaining control of a large part of the North China railway network and breaking into Manchuria through the Communist defense at Shanhaikuan.

When fighting started again in April, the Communists had a temporary advantage in Manchuria. The Communists claimed that they voluntarily abandoned Changchun when Chiang-Kai-Shek made its capture a condition for the renewal of the truce agreement, but, though they could no doubt have held out for some time longer at Ssepingkai, it is doubtful whether they could have defended Changchun permanently. Inside the Great Wall, the Communist position was almost certainly weaker in April than it had been in January as they had carried out a considerable amount of demobilization under the Army Reorganization Agreement.

When large scale fighting was resumed in China after the complete breakdown of the truce agreement, the Kuomintang made considerable gains in north Kiangsu and captured Kalgan in the north. One Communist statement said that the Kuomintang had captured over 180,000 square kilometers of Communist territory of which nearly 70,000 were in Manchuria.

Kuomintang's Optimism

Even when the Kuomintang was being most successful the claims of Kuomintang

generals that they could finish the war in six months were obviously wishful thinking. The Japanese had had all the railways by 1938 and by the end of 1939 they had captured nearly all the *hsien* cities except in the mountain areas, but this was only the beginning of their biggest anti-Communist campaigns. Both in the Kuomintang campaigns in the earlier civil war and in the Japanese campaigns in North China, the real struggle had come in the process of reducing the Communist base area by gradually advancing a network of forts and blockade lines. The close network of forts tied up very large forces which suffered a steady drain that became especially heavy when the village militia had developed into an effective fighting force and had become expert in land mine warfare.

Up to the end of 1943, the Japanese were gaining against the Communists, but as soon as they relaxed their efforts in North China they started to lose. By VJ-day, they actually controlled less of North China than they had in 1940. Even if the Kuomintang had retained its great superiority in positional warfare it would still be a matter of years, at the best, before it could eliminate the Communist armies. In fact, the Kuomintang would very likely have lost in a war of attrition. Even against the Japanese the Communists managed to maintain a favorable casualty ratio and the Kuomintang would find it hard to keep its army up to strength and prevent it from becoming demoralized when scattered in small garrisons in Communist areas, especially as the economic crisis cannot be solved until the Kuomintang conquers the countryside and reduces military expenditure and economic difficulties which are more serious for the developed Kuomintang areas than for the Communist countryside. Also, as long as wartime taxation and conscription continue, the Communists can use peasant discontent in the Kuomintang areas to build up new guerrilla activities in south and west China, forcing further dispersion of the Kuomintang army and reducing its resources.

Weakness in Positional Warfare

The surprising development in the last few months has been the apparent weakness of the Kuomintang army even in positional warfare. They have not been successful in keeping control of the railways. They have not yet cleared the Tientsin-Pukow railway and, since last autumn, have several times lost control of considerable stretches of the Peiping-Hankow and Tungpu railways. Even the key Peiping-Tientsin line has often been interrupted.

More remarkable has been the failure of Kuomintang offensives in Shantung Province. In October and November 1946, there was a considerable Kuomintang offensive in the Shantung peninsula and at one time it was reported that Kuomintang troops were on the point of capturing Chefoo. Recent reports indicate, however, that Chefoo and the peninsula are still almost entirely in Communist hands. The earlier Kuomintang offensive in central Shantung seems to have failed, with the Kuomintang admitting the loss of two divisions and the commander of a third.

All this suggests a considerable change in the relative strengths of the two armies. Last summer it would have been reasonable to suppose that the Kuomintang was strong enough to hold all the main railway lines and that when they were prepared to use a force running into the hundred thousands, as they are in the present Shantung offensive, they could go through any Communist area and capture all the cities if they could not eliminate the Communist armies or control the countryside. Recent fighting in Manchuria seems to show a similar change in strengths.

A clue to the reason for this development is contained in Communist war claims. In the early stages, their obvious

strategy was to avoid large scale positional battles but to inflict the maximum possible losses on the Kuomintang armies. It has been clear that the important question has not been the capture of particular positions but whether the Kuomintang could capture them without weakening relative strength.

Figures on Relative Losses

The only figures available on relative losses have been put out by the Communists. Although those published in the United States are not complete, they show the main outlines of the picture. The Communists claim that up to October 1946, the Kuomintang lost about 200,000 men killed, wounded and captured. In a more recent report on the fighting from July 1946 to the end of the year they claim that, out of 219 divisions engaged against the Communists, the Kuomintang lost forty-eight, a quarter of them American equipped divisions. They also claim a casualty ratio of eight to one in their favor in the fighting up to October. Other figures giving monthly war results at the end of 1946 claim Kuomintang losses of between 60,000 and 80,000 per month, about half prisoners or deserters. A communique in February gives a list of three full generals, six lieutenant generals, and sixty-four major generals captured plus ten killed.

There is no way of checking these claims in detail though in some cases the Kuomintang has admitted the loss or even the desertion of some divisions. However, if they approach accuracy, they explain the change in relative strength of the armies. Kuomintang losses in prisoners would give the Communists much new equipment. The claims of ammunition captured are in the millions of rounds per month which is large by the standards of the Communist army. (During a period of heavy fighting against the Japanese the Communist army only used three million rounds in a year.) There have also been captures of artillery and even of some tanks.

It is, therefore, probable that the strength of the Communist army has been growing in the last few months, while the Kuomintang army may have lost an appreciable proportion of its best troops, and may be gradually losing superiority in equipment now that fresh American supplies are no longer coming in. There also seems to be evidence of a fall in Kuomintang morale.

Developments in south and west China are obscure. In November, communist sources reported widespread peasant revolts in Ssechuan and to a lesser extent in Kuangtung, Kuangsi, Yunnan and other provinces. There were said to be guerrilla bands with a strength running sometimes into thousands armed with rifles and sometimes even with machine guns and trench mortars. Since then there have been a number of reports of widespread banditry, not of organized guerrilla activity, but a guerrilla organization in its early stages is hard to distinguish from banditry. As there are reports that the Kuomintang army is moving a very large portion of its forces out of south China to join in the fighting in the north, the possibility of a rapid growth of new Communist areas in the south is important.

The present Shantung fighting is obviously a very important stage in the civil war. A Kuomintang victory would not end the war but might go a long way to restoring the position of a Kuomintang regular army fighting a Communist guerrilla organization. On the other hand, a serious Kuomintang defeat might change the balance of power between the armies in a way which would make Kuomintang defeats in regular positional battles possible and might even end the war in a matter of months if it so lowered the Kuomintang morale that it started a cumulative process of desertion to the Communists to get on the winning side.

Cooperation in Offensive Operations

Translated an digested by the MILITARY REVIEW from a Russian article by Colonel P. Kovantsev in "Krasnaia Zvezda" (U.S.S.R.) 18 October 1946.

MODERN battle, in which all arms and services participate, is made up of the activities of all troops, each of which uses its own type of weapon. For this reason, the organization of offensive operations is unthinkable without precise coordination of infantry, artillery, tanks, and aviation, synchronized in relation to objectives, time and space.

Coordination of effort and uninterrupted cooperation can be achieved only when the commanders of participating arms have previously worked out all the details of the impending action, and when their units have gone through proper training and have acquired knowledge and experience in extending mutual aid.

The organization of cooperation is based on the decision of the higher commander. Here is an example of how such cooperation is planned. During the preparatory period preceding the breakthrough on the Karelian Isthmus, the commander of a division participating in the main attack carried out the planning stage in this manner. On a reconnaissance trip with the commanders of his units, he made his decision and assigned missions to all the participating arms. Before this decision, a detailed study of the terrain and enemy was made. The commander had full data on the hostile fire plan and obstacles located before the enemy position and in its depth. A careful study of the situation enabled him to determine the location of the line of departure, line of assault, and time and sequence of occupying these lines by the troops.

At the same time, the objectives for artillery and aviation were determined. The sectors to be protected by smoke screens were pointed out, and a general plan of cooperative action of various small and large units, directed at the destruction of separate groups of the enemy and the seizure of defensive positions, was worked out. Moreover, the commander coordinated his general plan with the activities of the neighboring units and the units which were to be committed later in the division sector.

Further, the commander pointed out the sequence and methods of communication and liaison among rifle, artillery, tank, aviation, and neighboring units for all the stages of the impending battle. He also approved the location of command posts, explained to the officers the signal to be given for beginning the attack, and where the signal would originate.

Further reconnaissance was carried out by unit commanders. For better organization of cooperative action and clarification of special problems on separate sectors, reconnaissance trips were repeated two or three times with all officers.

After all the problems of cooperation had been carefully worked out and clarified, various missions were brought to the attention of the personnel of the first attack echelon. Thus, the entire personnel of the units which were to participate in the offensive knew well the assigned missions, and this, to a considerable extent, facilitated the breakthrough that followed.

In the organization of cooperation between tanks and other arms, the troops had to learn the following: when, by what signal, and which tank units leave the assembly areas to advance to departure areas; in which directions, sectors, and toward which objectives the tanks move, and with what mission; missions of infantry, artillery, aviation, and engineers in connection with the security of tank operations; liaison with other units; general

reference points on the terrain; signals for cooperation.

All this was later included into a schedule of cooperative action for all arms by stages, time, and objective. Infantry, artillery, and tank commanders had a common system of reference points and a method for requesting fires.

In planning the battle and in the organization of cooperative action, the division staff has a difficult job. When reconnaissance is completed, the staff has to formulate, as soon as possible, the decision made by the commander, to work out the combat order, to prepare a plan-table of the impending battle, a plan of combat security, and instructions for the organization of communication, artillery, fires, and supply; to issue an administrative order and a number of other operational documents. In addition to this, instructions are issued establishing the organization and the replacement of various units and the order of march toward the areas of departure. They also draw a plan for controlling the execution of all combat instructions issued to the troops.

The quality of cooperation among the troops on the battlefield depends upon the organization and strength of communications and liaison. The commanders of the different units during the offensive mentioned above were stationed most of the time with the division commander, or nearby. In addition, the representatives of attached and supporting units and their radio equipment were also stationed at the division command and observation posts. Almost every artillery battalion had a well trained artillery observer in one of the forward tanks. In some instances, the duties of artillery forward observers were performed by well trained tank officers. Communication between infantry and tanks in the course of the battle was affected by signals. With the artillery, tanks communicated by radio and rockets. Targets were pointed out by tracer bullets and shells.

It should be noted, however, that an abundance of different signals impedes cooperation. The number of signals should be limited and that they should be simple and easily understood. Rockets constitute the best method of visual signaling, for they can be seen by the majority of the personnel participating in the offensive. But the application of the rocket method should correspond to the situation.

Factors of time and terrain also affect the quality of cooperative action. If a unit goes far ahead and occupies a point or a line while a neighboring unit lags behind, cooperative action is unavoidably interrupted. It happens frequently that the tanks break away from the infantry, that the infantry lags behind, that the artillery is either late in opening fire or opens it before the predetermined time, that aviation bombs and attacks objectives and targets which were not assigned to it. Such unfortunate occurrences are excluded if cooperative action of all arms is previously worked out in detail and on the terrain, and if the commander determines precisely the time for the commitment of various small and large units.

We have learned that the cooperation of different arms on the battlefield has the desired effect when it has the fire support of all participating groups. The infantry should protect the tanks by its fire, for which purpose special fire groups are created. These groups destroy hostile tank destroyers. The tanks, in their turn, should destroy hostile weapons and manpower which impede the advance of rifle, platoons and companies. Direct support artillery, working with infantry and tanks and moving within their battle formations, should again help the infantry at all times while the tanks concentrate on the destruction of machine-gun nests, personnel, and direct-laying guns of the enemy. Aviation, especially attack aviation, receives signals from the infantry and suppresses or destroys objectives as indicated.

In September 1944, during the liberation of Soviet Estonia, one of our mobile tank groups went through a gap made in a German position. Having advanced twelve to fifteen kilometers, it came onto strong fire resistance and was stopped. A fire fight began which could have delayed the offensive. At that time, one of our attack aviation units flew over this mobile unit. The tankmen noticed the planes, released their rockets, the planes noticed it, and answered with a previously arranged signal. At the second approach of the planes, the tankmen, by a series of red rockets, showed them the location of the objective where the Stormoviks concentrated their fire. At the same time, an artillery observer, flying in a blimp, also notices these signals and reported to the senior artillery commander who immediately asked the tank commander for the coordinates of the target. When the attack aviation left the battlefield, the artillery opened up. Soon the resistance had ceased and the tanks continued their advance. This example clearly shows how important it is to know the signals of cooperation and to use them correctly.

The best means for achieving coordinated action in battle is preliminary training and tactical exercises for the troops. Such preparation on the Leningrad front, in the breakthrough on the Karelian Isthmus, was carried out after the plan of action had been carefully worked out. This plan was checked during tactical exercises in which all the troops participated. All training exercises were carried out on specially prepared fields, which had all the necessary obstacles and wire entanglements. All questions of cooperation, communication, and control were carefully worked out. Following these tactical exercises, corresponding corrections were introduced into the plan of impending battle.

Antarctic Survey

Digested by the MILITARY REVIEW from an article in "The Times" (Great Britain) 15 January 1947.

SINCE the voyages of Cook, Bransfield, and Bellingshausen, interest in the Antarctic has been due to the desire for discovery and the furthering of scientific knowledge. This interest culminated in the explorations some thirty-five years ago.

It is only since the war that the Antarctic has been in danger of becoming a political problem. With many new expeditions setting out, the questions being asked are whether uranium is the object of their quest, and what part the British are playing. In so far as exploitation of mineral resources is a motive for this new activity, it is potential and conjectural rather than actual. At present, only two practical purposes are served by development in this part of the world—meteorology and whaling.

Meteorology and the mapping of still unexplored parts of the mainland have been the main tasks of the British Falkland Island Dependencies Survey, which has been operating, though during the war under a security silence, among our possessions, the Graham Land peninsula and the groups of islands lying between the Falklands and the Antarctic mainland.

British Bases

British claim to the Dependencies is strong. It was Edward Bransfield who first sighted Graham Land in 1820, and, apart from the expeditions of Scott and Shackleton, of the total number of expedi-

tions ever made to Antarctica, seventy-six were British, twenty-nine Norwegian, twenty-four American, nineteen French, nine German, three Argentine, and two Spanish, while some other countries have made single expeditions.

The Dependencies were declared British possessions by letters patent of 1908 and 1917, and, apart from seasonal visits of magistrates to other islands, South Georgia has had a resident magistrate since 1909. That there has been no recent neglect of them is shown by the accomplishments of the Falkland Island Dependencies Survey.

For the 1943-44 season, two ships were acquired, the *Fitzroy*, for carrying stores, and the minesweeper *William Scoresby*. An expedition was fitted out whose object was the completion of the mapping of Graham Land, the setting up of wireless weather stations, and the economic survey of this Antarctic sector.

In February, the expedition reached Deception Island, the center of the South Shetlands and Graham Land group, which British magistrates had been accustomed to visit annually from 1910 until 1930 during the whaling season. Here a base was established for a weather station and for geological survey. A second base was established at Port Lockroy for weather observation and topographical survey.

In the following year a new ship, the sealer *Eagle*, was acquired, and having carried out the relief of the two bases already established, the party erected a hut on Coronation Island in the South Orkneys for occupation in the following year, and established a main base in Hope Bay on the northeast tip of Graham Land. Here another wireless and meteorological station was opened, and survey and mapping of the Graham Land coast was carried out besides marine biology and the collection of fossils.

The following season opened with the end of the war, and of the naval security silence imposed by it. The Survey became the responsibility of the Colonial Office. The *Eagle* was replaced by the *Trepassey*, a wooden Newfoundland vessel of 300 tons.

The reliefs were carried out at Hope Bay, Deception Island, and Port Lockroy, and a new base was set up at Cape Geddes in the South Orkneys, where a visit was paid to the Argentine meteorological post at Scotia Bay. This has been in operation since 1904, when the Argentine Government took over the observatory established in the previous year by the Scottish explorer, Dr. Bruce.

The hut on Coronation Island was then visited and finally, on 18 February, the *Trepassey* arrived to establish the farthest south base at Marguerite Bay in Graham Land. Here, after stores had been dumped and a hut erected, a party of eleven men was left ashore on a small island at Neny Fjord. It was here in 1940 that the United States Antarctic Service Expedition had its base, and some of its huts remain, although in a poor state of repair, about 250 yards from those occupied by the British party.

A Sledge Journey

The British party has been engaged in establishing a depot on the 5,000 foot inland plateau, a task of considerable difficulty. The intention is to sledge eastwards from here across Graham Land to the Weddell Sea. The east coast of Graham Land cannot be approached from the sea owing to ice, and accordingly can only be mapped by sledging across from the west coast. Later it is intended to pioneer a route northwards either up the center or the east coast to link hands with the Hope Bay party, who on their side have been making sledge journeys southwards on Trinity peninsula.

The objects of this expedition are entirely scientific, and it was the setting out of the routine relief party in the *Trepassey* which started a rumor that Great Britain was about to compete with

foreign powers in a search for uranium.

If the object of some other expeditions is the discovery and working of uranium, they are likely to be disappointed. Mineral wealth in a continent of 5,000,000 square miles is doubtless considerable, but little is known about it.

The importance, on the other hand, of the meteorological survey can scarcely be exaggerated. This is still incompletely organized and the unrivalled opportunities for learning about weather in the Antarctic have not been made best use of yet.

Coordinated Effort

In the northern hemisphere, a network of stations in the Arctic is responsible for the comparatively accurate weather forecasting which is now possible. In the Antarctic, which is geographically symmetrical, even better results could be obtained for the southern hemisphere.

For this, a network of stations taking synhcronized observations would be effective, and there seems good reason why Australia, South Africa, and New Zealand, all of whom are taking a renewed interest in the Antarctic, should coordinate their efforts with the Survey to that end. Forming part of the British Commonwealth, the means for coordination is easy for them.

Nothing but benefit would come from cooperation by other powers with stakes in Antarctica for genuine scientific purposes. Norway, for instance, has sovereign claims to the area between Coats Land, in the Dependencies, and the Australian Antarctic Territory whose validity is accepted by the United Kingdom, Australia, and New Zealand; and France's claim to Adelie Land is also recognized by us. There are other countries too, with claims not so precisely defined, which can help in this work provided that the activities of all are properly planned to prevent overlapping.

Soon after the start of the war, the Japanese occupation of the Aleutian Islands of Attu and Kiska focused attention upon Alaska. The plans of the enemy in respect to Alaska and the Pacific Northwest were not known, but a study of the possibilities of the Jap thrust showed the absolute necessity of denying this area to the Japs. There ensued immediately a mighty effort on the part of both services to prepare bases, bring in personnel and materials, and secure lines of communications.

Rear Admiral F. A. Daubin

Safaga—A Port on the Red Sea

Digested by the MILITARY REVIEW from an article by Brigadier G. Streeten in "The Royal Engineers Journal" (Great Britain) December 1946.

IN June 1941, the German Army in the desert was at the western frontier of Egypt, and Tobruk was beseiged. The possibility of a *blitz* on Suez and consequent serious disruption of activities at that port had, therefore, to be considered.

As a result, two alternate ports were considered—Safaga and Quseir, both on the Red Sea. At Safaga, there existed a jetty, alongside which a fair-sized freighter could berth, but it was too short to permit loading at more than one hatch at a time. Quseir also provided facilities for berthing a freighter but was completely unprotected. There is a rough trail running along the shore in a southerly direction from Suez by way of Ras Gharib and Hurghada to Safaga, about 330 miles distant, and continuing slightly inland to Quseir. Trails or tracks also connected the two ports with the Nile Valley at Qena and Qift, the distance between the Red Sea and the Nile being approximately 100 miles.

Safaga was chosen for enlargement and development. Rail connection between Safaga and the branch of the Egyptian State Railway up the Nile Valley was an essential part of the scheme.

Topography

The limestone escarpments of the River Nile give place, on approaching the Red Sea coast, to a range of granite hills rising to about 7,000 feet, the highest point in Egypt. Midway between Aswan and Asyut, the Nile makes a loop to the east so that Qena is its nearest approach to the Red Sea coast.

Between Qena and the granite range, the country is cut up by *wadis*. Above Safaga is an extensive plateau in the granite hills, entirely unmapped. The rainfall at this point averages less than one inch a year.

There are two passes through the granite range giving access to Safaga, one by Wadi Safaga and the other by Wadi Hamamat. There are no villages and very little water.

The hills are rich in mineral wealth which, except for phosphates, has been developed but little. In the Wadi Hamamat are granite quarries which were worked by the ancient Egyptians. Not far away is a gold mine originally dug by the Romans. Wolfram is also mined in the neighborhood and outcrops of talc appear in the sides of *wadis*.

Communications

The main line of communication at the outset was the sea route from Suez to Safaga. The standard gauge railway running up the Nile from Cairo to Aswan was used to some extent, as also was the Nile itself for bringing stores to Qena. There was also a dirt road which followed the Nile from Cairo to Qena, a distance of some 400 miles.

Of the two main tracks connecting Safaga with the Nile at this point, that from Qena to Safaga was the main route. The other following the track from Qift to Quseir as far as Bir Seyala and then branching north, was considerably longer. The track from Qift to Quseir had probably been in existence as long as any known road. Both these routes were used for carrying personnel and stores to Safaga during the building of the port. On the proposal to build a permanent road between the Nile and the Red Sea, a new line following Wadis Merkh, Abu Shia and Um Tagher was finally selected.

Quays and Wharves

The general scheme for the port included the following:

1. *South lighter wharf.*—This was 800

feet long, constructed of steel sheet piling, and gave a depth of about nine feet of water.

2. *North lighter wharf.*—This was 600 feet long, with about nine feet of water, also constructed of steel sheet piling.

3. *Deep water quay.*—The original design was for a length of 2,000 feet, to berth four freighters with a maximum draught of twenty-eight feet. Its face was to be formed of sixty foot steel sheet piling driven some thirty feet into the sand. Immediately behind the face was to be a crane rail carried by reinforced concrete beams on pile bents of the same construction.

4. *Locomotive piers.*—It would be necessary to bring locomotives by sea to Safaga long before completion of the deep water quay, which was planned originally for locomotives of thirty-five tons. The possibility, however, of having to use the pier for ninety-ton locomotives became clear later on, and the pier was actually constructed to allow for this.

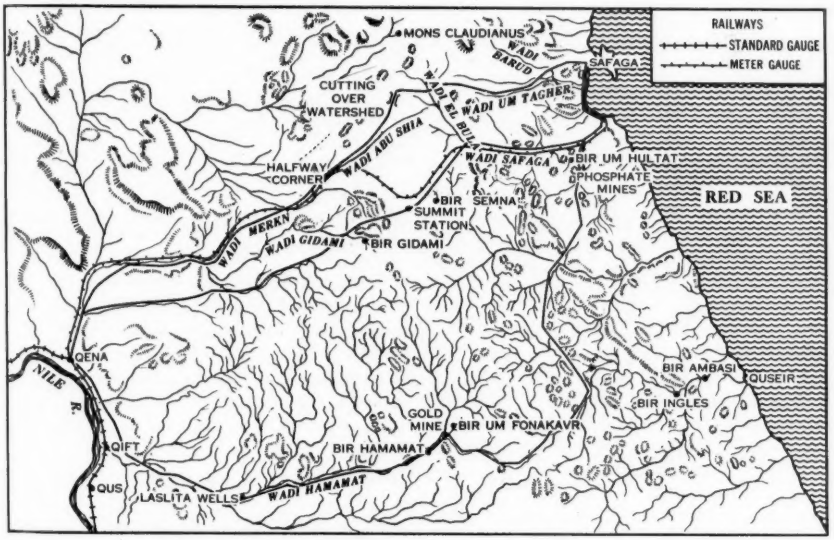
5. *Petrol jetty and reservoirs.*—It was decided to provide facilities for the storage of petrol with two 6,000-ton welded steel tanks.

Auxiliary Projects

1. *Accommodation.*—There existed a meter guage railway from the mine to the phosphate works where there were sidings, buildings and plant for the purification of the phosphates and loading at the pier. There were, in addition, houses and a club for the European staff and a village for the native workers; also a steel reservoir capable of holding a reserve of 3,000 tons of water received by sea.

Soon after the arrival of the troops, a sub-area was formed. Officers and a camp for the staff had to be provided together with quarters. Camps also had to be built for the troops and workers.

2. *Installations.*—(a) A supply depot. (b) A vehicle assembly unit for the assembly of vehicles to be shipped in crates from the United States. (c) A dump for



tinned (5-gallon cans) petrol and a petrol supply point consisting of a reservoir, oil store and stand pipes for filling trucks. (d) An ordnance depot.

3. *Miscellaneous work.*—(a) A new landing field was built some distance north of the deep water quay. (b) The following were also constructed: cold storage, slaughter house, petrol tin factory, tin filling plant, engineer store and workshops, water transport workshops, two distillation plants, wireless station and signal office, oil tank for railway use, and power station. (c) Two low level and two high level reservoirs for the storage of water were provided.

4. *Railway.*—An integral part of the project was the construction of a railway from Qena to Safaga.

The only practicable route at the Red Sea end, where the range of hills sloped down to the sea, was by way of Wadi Safaga, which is steep and exceedingly twisty. The Wadi Merkh, which the road was to follow for the greater part of its course, was much wider and of gentler slope.

5. *Qena.*—A camp in the desert east of Qena village formed the main base for the construction of the road and railway to Safaga. The transfer sidings and marshalling yard connected the meter gauge railway from Safaga with the standard gauge to Cairo were sited close to this camp. An engineer park, a camp for motor transport, headquarters and headquarters company, a cold storage and a supply depot were also located nearby.

An ammunition and explosives dump and a large bomb dump for the RAF were hastily formed at Qena when the enemy was approaching El Alamein.

6. *Qena Accostage.*—A proportion of the stores for the Middle East Base in Egypt was landed at Port Sudan and carried to Cairo by rail and river. The stores were taken north from Wadi Halfa in Nile barges. If the stores formerly brought from Port Sudan could be landed instead at Safaga and carried down the Nile from Qena, the barges could do double duty. It was, therefore, decided to work out a scheme whereby the edge of the Nile bank at Qena could be shaved off so as to permit loading of barges. Barges could then be moored alongside the slopes, so natives could carry the stores to deposit them in the barges. Such was the design of the "accostage."

All these operations were started, provision being made for the loading of about 2,000 tons a day. They involved the extension of the meter gauge railway from the transfer sidings at Qena to the river bank. The existing dirt road along the Nile bank had also to be improved to connect up with the "accostage." An existing bridge over a canal had to be widened to take railway and road and an additional bridge for the railway had to be constructed.

Progress of the Work

In July 1941, a garrison engineer was installed at Safaga to make a survey for the south lighter wharf and a boring section followed to drive test piles for the deep water quay. Soundings were commenced for the latter and a final plan prepared in January 1942. The letting of a contract for driving the reinforced concrete piles followed soon afterwards. In the meantime, some piles had been cast and a start made in the construction of caissons for the anchor wall. A total of 424 piles had to be driven in two rows to form the trestle bents to carry the crane rails. Various delays prevented completion till towards the end of July.

The sixty-foot steel piles were to be driven from the crane beams on top of the bents and were started in July. The construction of the anchor wall proceeded with the driving of the piles, and about one-third was completed by mid-July. Tie rods were not available and work was

henceforth continually held up on this account.

On completion of the sheet piling, it was necessary to dredge to obtain a depth of thirty feet of water. A dredger from India arrived in October, 1942.

One night a German bomber came over. There was no antiaircraft protection whatever. The bomber, being quite unmolested, got a direct hit on the dredger and about eighty of the crew were killed.

By December, 1942, the majority of the sheet piles were driven, but by this time, Rommel's army had been pushed back to El Aghelia and there was now little chance of any serious attack on Suez. Finally, in January 1943, only one berth was completed, and Safaga was put into care and maintenance soon after, the deep water quay never having berthed a single ship.

The south lighter wharf, the construction of the causeway and bridge, and the laying of the railway, was completed in March, 1942.

The north lighter wharf was not started until January, 1942, and finally completed in August.

The locomotive pier was completed and six thirty-five ton locomotives were successfully unloaded in April, 1942, without settlement.

The petrol jetty and storage tanks were ready to take one ship by the end of the year, but the jetty was not finally completed until early in 1943. Accommodation generally was completed by the end of 1942.

Improvements to the existing landing field were carried out early in 1942, and by the end of that year two landing strips for the new field were completed.

Houses for the two distillation plants were built and the machinery erected by April and June, 1942. It was found that one hundred-weight of coal was needed to produce a ton of water, each plant distilling 150 tons of water a week.

The slaughter house, cold storage, tin making factory and tin filling plant were built after difficulties in getting labor. By early 1943, the power station was running satisfactorily.

For the Qena "accostage," the work was completed by the end of 1942.

Development of Water Supply

It was estimated that 150 tons of water a day could be obtained from wells at Mons Claudianus. Two boreholes were sunk near the Roman tower well, but they only produced about fifty tons a day. The total yield of 200 tons was, however, well worth piping to Safaga, whose needs amounted to about 300 tons a day.

Pumping stations were necessary at the wells to raise the water to the head of the Wadi El Bula, whence it fell by gravity all the way to Safaga.

Conclusion

A considerable sum of money and a large number of man-hours were expended upon this project with no apparent help to the war effort.

The following conclusions may be drawn:

First, the desirability of thorough preparation, in the assembly of labor and materials and in the provision of a sure line of communications before the work begins.

Further, the need to keep the labor force contented became apparent, as also did the grave objections to opening a part of the work for use before it had been properly finished.

On the technical side, local conditions must be studied carefully before such a scheme is worked out. The necessity for continual dredging was realized from the start and provision for a dredger made. Another technical point that became apparent was the need for accurate soundings before the plans were made.

In addition to its value as insurance, the work at Safaga gave good training for Royal Engineer Works Services Organization, the Army Troops Company, and the staff and other troops engaged upon it, in an operation not often met with in wartime.

Hygiene Problems in Europe

Digested by the MILITARY REVIEW from an article by Major M. Hunter in the "Journal of the Royal Army Medical Corps" (Great Britain) January 1947.

THE various factors contributing to the "remarkable success of the medical organization" in the campaign of Northwest Europe have been described from the purely medical and surgical aspects, but apart from articles on isolated incidents, no attempt has been made to give an overall picture of the preventive medicine and epidemio-logical aspects.

The campaign can be divided into four phases. The overcrowded Normandy beachhead and its gradual enlargement were associated with unpleasant weather, dust, flies, and large-scale destruction of towns and villages. Water supplies and sanitation were of the greatest importance. The disposal of dead animals was also a problem in some areas, but not insoluble when flames, explosives and bulldozers were available.

The second phase started with the debouchment from the Falaise "pocket" and covered the rapid advance across the Seine to Antwerp, Brussels and Nijmegen.

The third phase covered the autumn of 1944 and the winter of 1945. Snow, bitter cold and heavy rains were experienced in Holland, Eastern Belgium and across the German border.

Finally, there were the Rhine crossings and the rapid advances to the River Elbe and the Danish border. This period covered the disintegration of the German Army in a completely disorganized society in a devastated country, the uncovering of the horror camps of Belsen and Sandbostel, and the disposition of vast numbers of exprisoners of war, displaced persons and refugees.

Preparation and Organization

Men of Twenty-first Army Group were fully immunized and fully trained, well clothed and well fed. Immunization was provided against typhoid, paratyphoid, tetanus and typhus. The results speak for themselves, for only twenty-five soldiers out of the whole Army Group contracted typhus, and only one outbreak of typhoid fever occurred.

Experience in the Middle East had emphasized the importance of hygiene, and units from that theater were definitely "hygiene conscious." Units leaving England for the first time had not had this experience, but their water and sanitary duty personnel were fully trained. Clothing, equipment and feeding were very satisfactory throughout the campaign.

The organization of preventive medicine was built up on experience of past campaigns. As the most forward Royal Army Medical Corps representative, the Regimental Medical Officer was responsible both for the health of his men and for their treatment when sick or wounded. To assist him, field hygiene sections were provided on the scale of one per division, with additional sections at corps and army level.

Directors of hygiene at corps and army headquarters supervised the work of these sections, while field sanitary sections were employed at base and lines of communication.

Overall direction of hygiene matters rested with the director of hygiene at army group level, and he also controlled the mobile hygiene and bacteriological laboratories.

This organization worked well. All sections were fully mobile, moving with their formations; the organization insured that hygiene problems could be dealt with immediately.

Practical Aspects

Adequate supplies of water for drink-

ing, cooking and washing were not a serious problem in Northwest Europe.

There was always the possibility that the enemy might use poison gas or poison the water supplies. Fortunately, this did not happen, although the Royal Engineers and Medical Services were fully prepared to deal with it.

Certain other difficulties did, however, arise. In the confined Normandy beachhead, the rivers were few and their water used by very large numbers of troops. Close supervision was essential to prevent their becoming so polluted that they were unfit for drinking. In parts of Belgium, waters with a very high iron content made chlorination difficult. Freezing of filters had to be closely watched in winter. Bombing, whether our own or the enemy's, was always liable to affect civilian supplies which were so largely drawn upon.

The methods used for sterilizing water were:

(a) Every soldier who required it was issued a water sterilizing outfit containing Halazone tablets and detasting tablets.

(b) Water trucks of 200-gallon capacity complete with testing boxes, filter powder, water sterilizing powder and taste remover tablets were supplied to battalions, regiments and separate units. These trucks were fitted with power-operated pumps and filters and had a filtration capacity of 400 gallons per hour.

(c) Engineer water points were usually sited in corps and army areas, and were either mobile (trailer type) or static chloraminators.

(d) Jerricans were also used by small units or detachments. No outbreak of waterborne disease occurred throughout the campaign.

The provision of latrines, disposal of refuse, and effluents from mobile laundry and bath units followed accepted army principles.

From 1939 to 1944, the army gained much experience in the provision of rations suitable for different types of operations and climates. As a result of this, the troops operating in Northwest Europe received the following types of rations: twenty-four-hour ration pack; composite (14 men) ration pack; and field service ration scale.

Self-heating beverages (soups, cocoa, malted milk) were also available and invaluable for troops holding difficult positions. Armored fighting vehicle packs and airborne packs were available for special purposes.

Milk was provided as tea, sugar and milk mixture, or in tins of powder form. Bathing and laundry arrangements for the troops were based on the provision of mobile laundries and bath units. They were under command of corps but during operations one worked for each division. In theory, each unit could provide a clean issue of underclothing and a shower bath for every soldier once a week. In practice, this was not always possible because of operations. In addition to ordinary laundering, the units impregnated shirts with a solution of DDT which would kill any lice hatching from eggs.

In the war of 1914-18, the incidence of trench foot was 0.503 per thousand. In 1944-45 it was 0.049 per thousand. This low incidence is remarkable, for it is much lower than that experienced by the Americans fighting under similar conditions, and very much lower than that of the German Army.

As the period was one of continuous fighting, and as Twenty-first Army Group was within easy access of training establishments in the United Kingdom, it was not considered practicable to establish a hygiene school in the theater until operations had ceased. Field hygiene sections did, however, give courses of instruction in water duties and in sanitary duties when operations permitted.

In the Normandy beachhead all troops were in bivouacs in the ground or under canvas, but with the onset of winter and the occupation of Belgium, Southern Holland and the eastern border of Germany, units were scattered over a wide area. In this area it was possible to accommodate the majority of the "non-fighting" troops in buildings and to provide reasonable accommodation for fighting troops when they were withdrawn from forward positions.

After crossing the Rhine in March 1945, movement was almost continuous for many units, and tentage was used again.

Civilian Features

In comparison with other campaigns, the refugee problem in northwest Europe was a small one. In Normandy, many civilians lost their homes, their whole village or the major part of their town. Others had to be temporarily evacuated. Corps refugee camps were established and movement controlled by civil affairs staffs until more permanent accommodation could be found. Similar arrangements were made in the area between the Maas and Rhine. Destruction of property in this area was very great, and an enormous number of troops had to be packed into it prior to the Rhine crossings. Civil Affairs had by now changed its name to Military Government, and was a much more powerful organization. The German inhabitants were assembled and kept in selected areas until it was expedient to allow them to return home. The mere mention of these two areas may give a false impression of the refugee problem, and certainly does not do justice to the work of the Civil Affairs and Military Government Staffs. The fact that such obstruction was minor is a tribute to these Staffs.

The problem of displaced persons started after the Rhine crossings, because the Germans evacuated their slave laborers from Belgium and Holland before the Allies reached their camps. Once across the Rhine there was neither the time nor the transport for further movement.

Officially, there were two types of displaced persons, although both types were nationals from other countries working in Germany either voluntarily or involuntarily. The first type came from Poland, Russia, Italy and the Balkans, and the plan was to keep him as far east and as near his homeland as was possible. The second type came from countries west of the Rhine, and had to be sent home just as fast as transport facilities permitted. The total number of displaced persons to be dealt with was over two million. Transport was the great difficulty.

A system of camps was, therefore, set up to hold the displaced persons until transport could be arranged. The camps were set up on the river barriers (Rhine, Weser and Elbe) to prevent the eastbound displaced persons from filtering to the west, and to retain the westbound until they could be evacuated through organized channels.

The difficulties of accommodating, feeding, delousing and providing medical attention, water, sanitary arrangements, and bedding for such a mass of humanity must be left to the imagination. Providentially, VE-day occurred at the beginning of summer. Had it occurred six months earlier or later, this story of the displaced persons would have been a much less happy one.

Belsen and Sandbostel

Belsen is a name which will go down in history, and although much has been written on the medical and legal aspects, it was first and foremost a hygiene problem.

Intelligence had notified VIII Corps of the existence of this camp, of the presence of disease, and of the failure of electricity and water supplies. No one, however, could have imagined the conditions which actually existed. Approximately 38,000

men and women and 500 children were living under indescribably squalid and overcrowded conditions. There were enormous pits full of bodies, and more bodies lying either in heaps or singly throughout the two camps. Hospital accommodation was grossly inadequate, and typhus, typhoid fever and tuberculosis were widespread. Sanitary arrangements were practically non-existent. Even if they had existed it is doubtful whether the inmates would have had the strength to use them. The chief problems were provision of drinking water; provision of food; disposal of the sick; burials; dusting for lice; bathing, and latrines.

Sandbostel was a camp northeast of Bremen containing approximately 7,000 political prisoners and 15,000 United Nations prisoners of war. Conditions were not so appalling as at Belsen, but there were 791 cases of typhus, almost all among political prisoners. Much the same routine was followed as at Belsen, i.e. dusting for lice after passing through a "human laundry," attention to sanitation, and evacuation of the sick to near-by hospitals.

Ex-Prisoners of War

During the period 4 April to 4 May 1945, 93,844 ex-prisoners of war were found in the British Zone of operations in Germany. Of this total, 16,787 were from the British Empire, 4,270 were Americans, and the remaining 72,787 were of other nationalities, including Russians, Belgians, Yugoslavs, French, Polish and Italians. As their camps were uncovered, a plan similar to that used for displaced persons was put into operation. Collecting and transit camps were provided for the westbound ex-prisoners of war, and they were accommodated, fed, given new clothing, and dusted with anti-louse powder while awaiting transport. Air transport was used on a large scale and, operating from airfields inside Germany, each plane had its complement of ex-prisoners of war back in England within a matter of hours. Some few of these ex-prisoners of war developed typhus after arrival in the United Kingdom, Belgium and France, but so far as is known, there were no secondary cases. Repatriation of the eastbound ex-prisoners of war was inevitably delayed until travel facilities with Russia, Italy, etc., could be established. These ex-prisoners of war had, therefore, to remain in their camps or be moved into better accommodations.

Prisoners of War

The number of prisoners of war taken by Twenty-first Army Group was very large, and their accommodation was often a considerable problem. The routine was that after capture, the German prisoners of war were passed back to cages at corps level and retained there for a short period until transport was available for their transfer. It was a hygiene responsibility to see that these prisoners of war were efficiently "de-loused" at corps level, and to insure that the standards of food, water supplies, sanitation and accommodation in the camps were adequate. As the intake of prisoners of war could never be estimated in advance, these standards often varied and were at times too low. In fact, when the cease fire was ordered on 5 May, it was not considered advisable to put all the prisoners of war "into the bag." They were, therefore, "sealed off" in areas along the North German Coast and ordered to look after themselves (under British supervision) until demobilization could be arranged.

Selecting the RAF Officer

Digested by the MILITARY REVIEW from an article in "The Royal Air Force Quarterly" (Great Britain) March 1947.

FOR some time a band of men have been working on an RAF problem which is fundamental to the Service: how to plan the selection of permanent officers on a sounder basis than before the war. Their system is a great improvement on the pre-war method of written examination and interview.

Take the case of a candidate for a cadetship at the RAF College, Cranwell. He hopes to become a General Duties Officer. The medical examination can settle whether or not he has the health to do the job. Science has made great strides in assessing his practical ability—his coordination of brain, hand and eye—and can give confident assessments through the "flying aptitude" tests. The written examination and his educational standard can help assess his intelligence and knowledge, but psychology has taught the vital difference between possessing intelligence and using it. On the character side, RAF officers "know the sort of chap who fits into the life of the Service." And here are called in the psychologists and psychiatrists who can provide a scientific background and scientific methods to the intuitive judgments of the Service officers.

The precise nature of the tests is not important; their purpose is to provide a setting in which to observe the behavior of a group, and from that to judge the character of individuals. The tests take place indoors and outdoors in the country, with three groups of eight candidates passing through at a time. Candidates are anonymous, and distinguished from each other only by numbers. Their names are not known to the testing officers, but only to the commandant. This aims at eliminating any possibility of favoritism.

The members of each group are assessed from three different standpoints. There is a Wing Commander regarding them as a senior officer faced with potential junior officers; there is a Squadron Leader, closer to them in age and outlook, who looks at them as potential companions; and thirdly, a psychiatrist who assesses them from his own specialist angle. The President of the Board has an overall view of the whole twenty-four and provides standardization. The problems include both written tests and outdoor exercises. Some may be for solution by the group, some for solution by individuals. No one is passed or failed on his ability to solve the problems or tests. In all the tests the officers are looking to see what qualities of character and ability are revealed.

The instructions given to each candidate include this passage: "The Selection Board wish to see you as your natural self and to find out your qualities and ideas. You will, therefore, assist the Selection Board most by being natural and excluding shyness or the adoption of artificial or superficial poses."

The final test may be to transport a large drum and the team across a lake, with the aid of a rubber dinghy, thin poles, stouter planks, and some small drums. None of the team may wade across, and the large drum must be kept dry. At each test, each officer has jotted down concise observations from which the final report is written. The final reports of the three different observers are coordinated by the President, and compared with his own impressions. The Board reaches agreement on the first stage—assessing the candidate's ability, character and personality. Then begins the second stage, projecting the candidate forward and assessing his potential as an RAF officer. When final agreement is reached, the overall assessment is forwarded to the Air Ministry.